

Postgraduate Certificate

Radiophysics in External
Radiotherapy in Physical
Dosimetry





Postgraduate Certificate Radiophysics in External Radiotherapy in Physical Dosimetry

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

Website: www.techtute.com/pk/medicine/postgraduate-certificate/radiophysics-external-radiotherapy-physical-dosimetry

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01

Introduction

The rise of medical technology over the last decade has driven advances in external radiation therapy. One example is Cone Beam Computed Tomography (CBCT), which makes it possible to obtain detailed three-dimensional images to design personalized treatments for patients with conditions such as tumors or cysts. As a result, specialists are able to apply therapies that minimize the irradiation of healthy tissues, also reducing the time the patient is exposed to radiation and providing more efficient care. However, in order to achieve an adequate use of this tool, it is important that experts take into account the most up-to-date considerations associated with its use. In this context, TECH has a 100% online program that will delve into this clinical practice through a disruptive methodology: *Relearning*.



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You will acquire updated knowledge on the latest Calibration Protocols, avoiding errors and thus offering your patients the maximum diagnostic accuracy”

The World Health Organization estimates that, each year, 400,000 children and adolescents suffer from cancer, specifically pathologies such as leukemias, lymphomas or Wilms' tumors. In this sense, Radiotherapy is an effective procedure for their treatment. In view of this situation, healthcare institutions are constantly modernizing their procedures in order to apply the most advanced electron beam procedures. Therefore, experts must keep abreast of the latest trends in their work practice and, thus, provide cutting-edge therapies to their patients and contribute to improving their quality of life.

To help them with this task, TECH has implemented a comprehensive university program that will enable physicians to optimally handle the most innovative equipment for performing External Radiation Therapy treatments. Under the supervision of a distinguished teaching staff, the syllabus will delve into the use of the Linear Electron Accelerator. In this way, specialists will carry out special techniques such as Handrontherapy to treat localized tumors in areas close to critical structures of the body. In addition, the curriculum will analyze the equipment in image-guided External Radiation Therapy, emphasizing photon beams in physical dosimetry.

At the same time, TECH offers a 100% online educational environment, adapted to the needs of health professionals seeking to advance their careers. In addition, it will employ the *Relearning* methodology, based on the repetition of key concepts to fix knowledge and facilitate learning. In this way, the combination of flexibility and a robust pedagogical approach makes it highly accessible. In addition, the only thing the expert will need is a device with Internet access, such as a cell phone, computer or *tablet*, to access the Virtual Campus. In this space, they will have a library full of multimedia resources to develop a dynamic and interactive update of their skills.

This **Postgraduate Certificate in Radiophysics in External Radiotherapy in Physical Dosimetry** 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



Do you want to perform effective treatment verification prior to radiotherapy sessions? Delve into the Initial Referral in just 6 weeks with this advanced TECH qualification"

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You will create detailed process maps to identify errors and take preventive measures to avoid radiological risks for your patients”

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 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.

You will master the particularities of the Linear Electron Accelerator and its therapeutic advantages through 150 hours of the best 100% online teaching.

This is a flexible university qualification that is compatible with the most demanding daily responsibilities.



02 Objectives

This curriculum, developed by an experienced teaching staff, will enable students to master the most advanced equipment in the performance of external radiotherapy treatments. In this sense, graduates will establish the different mechanisms of simulation, localization and image-guided radiotherapy. They will also be able to develop calibration procedures for both photon and electron beams, while effectively applying the quality control program.





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Thanks to the revolutionary Relearning methodology, you will integrate all the knowledge in an optimal way to successfully achieve the results you are looking for”



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 Objective

- ♦ Examine the quality control program of radiotherapy equipment

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A curriculum that will allow you to acquire skills in a flexible and efficient manner through the portable device of your choice”

03

Course Management

In its maxim of providing quality education, TECH has a prestigious teaching staff. Through their guidance, experts will update their knowledge and renew their skills in Radiophysics in External Radiotherapy in Physical Dosimetry. These professionals have an extensive professional background, which has enabled them to be part of prestigious hospitals. Thanks to this, the study plan will provide the specialist with the latest scientific advances in this health field. Therefore, the students will have the guarantees required to keep up to date in a continuously evolving sector.





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You will have access to a study plan designed by a recognized teaching staff made up of highly prestigious specialists in the medical-healthcare field”

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
- ♦ 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. Morera Cano, Daniel

- ♦ Specialist in Hospital Radiophysics
- ♦ Hospital Radiophysics Faculty at the University Hospital Son Espases
- ♦ Master's Degree in Industrial Safety and Environment by the Polytechnic University of Valencia
- ♦ Master's Degree in Radiological Protection in Radioactive and Nuclear Facilities
- ♦ Degree in Industrial Engineering from the Polytechnic University of Valencia



04

Structure and Content

Through a complete module, students will delve into the most modern technological resources in External Radiation Therapy. In this way, the syllabus will address tools for patient therapies as well as for simulation, localization and image guidance. In this sense, special attention will be given to radiation beams, in order to apply them safely and ensuring that they correspond to those calculated in the treatment planning system.



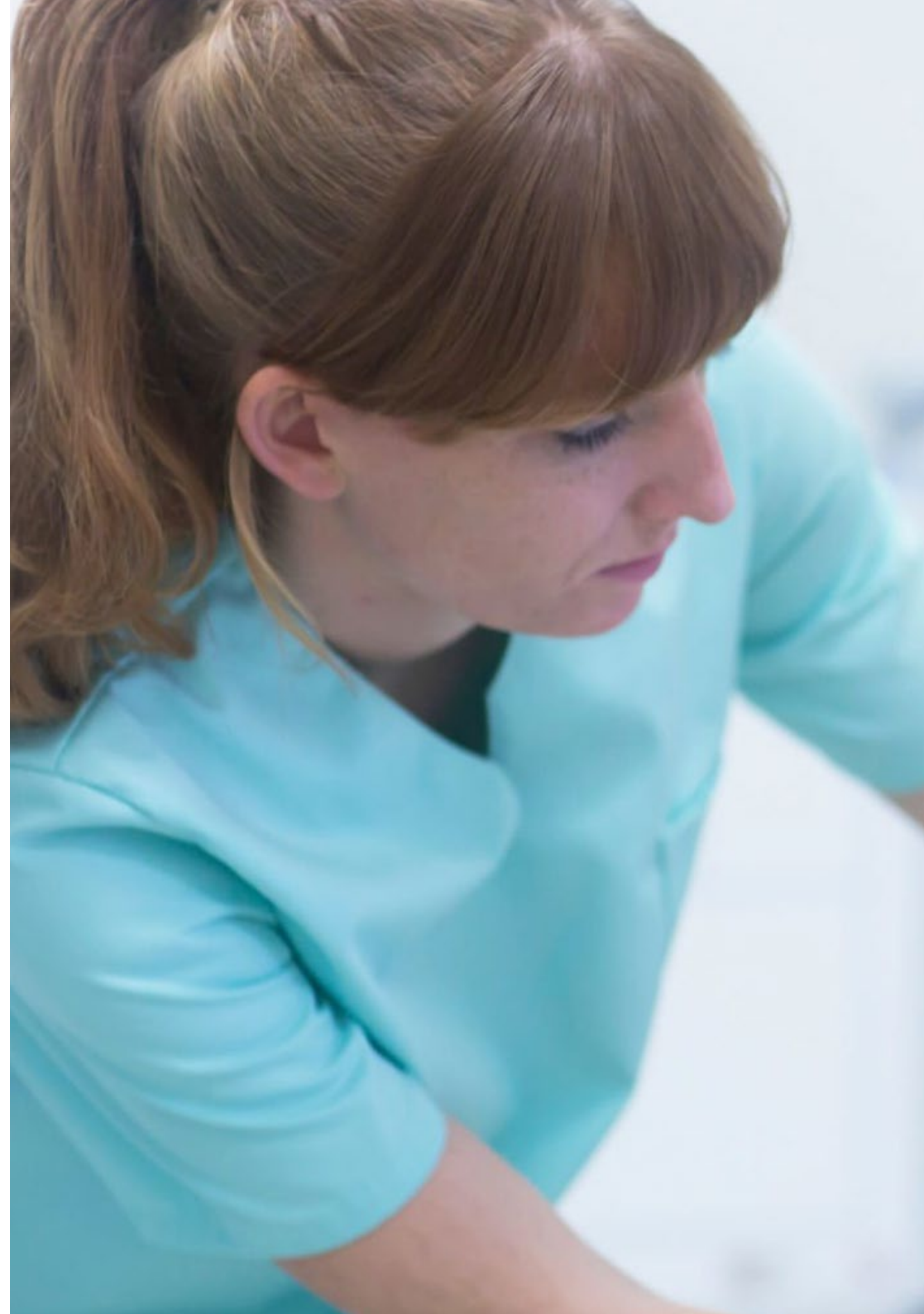


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You will be highly qualified to develop the most effective quality control procedures in External Radiation Therapy after this academic pathway”

Module 1. External Radiotherapy. Physical Dosimetry

- 1.1. Linear Electron Accelerator. Equipment in External Radiotherapy
 - 1.1.1. Linear Electron Accelerator (LEA)
 - 1.1.2. External Radiotherapy Treatment Planner (TPS)
 - 1.1.3. Record Keeping and Verification System
 - 1.1.4. Special Techniques
 - 1.1.5. Hadrontherapy
- 1.2. Simulation and Localization Equipment in External Radiation Therapy
 - 1.2.1. Conventional Simulator
 - 1.2.2. Computed Tomography (CT) Simulation
 - 1.2.3. Other Image Modalities
- 1.3. Image-guided External Radiation Therapy Equipment
 - 1.3.1. Simulation equipment
 - 1.3.2. Image-guided Radiotherapy Equipment. CBCT
 - 1.3.3. Image-guided Radiotherapy Equipment. Planar Image
 - 1.3.4. Auxiliary Localization Systems
- 1.4. Photon Beams in Physical Dosimetry
 - 1.4.1. Measuring Equipment
 - 1.4.2. Calibration Protocols
 - 1.4.3. Calibration of Photon Beams
 - 1.4.4. Relative Dosimetry of Photon Beams
- 1.5. Electron Beams in Physical Dosimetry
 - 1.5.1. Measuring Equipment
 - 1.5.2. Calibration Protocols
 - 1.5.3. Calibration of Electron Beams
 - 1.5.4. Relative Dosimetry of Electron Beams
- 1.6. Implementation of External Radiotherapy Equipment
 - 1.6.1. Installation of External Radiotherapy Equipment
 - 1.6.2. Acceptance of External Radiotherapy Equipment
 - 1.6.3. Initial Reference Status (IRS)
 - 1.6.4. Clinical Use of External Radiotherapy Equipment
 - 1.6.5. Treatment Planning Systems



- 1.7. Quality Control of External Radiotherapy Equipment
 - 1.7.1. Quality Control of Linear Accelerators
 - 1.7.2. Quality Control in the IGRT Equipment
 - 1.7.3. Quality Control in Simulation Systems
 - 1.7.4. Special Techniques
- 1.8. Quality Control of Radiation Measuring Equipment
 - 1.8.1. Dosimetry
 - 1.8.2. Measuring Tools
 - 1.8.3. Mannequins Employed
- 1.9. Application of Risk Analysis Systems in External Radiation Therapy
 - 1.9.1. Risk Analysis Systems
 - 1.9.2. Error Reporting Systems
 - 1.9.3. Process Mapping
- 1.10. Quality Assurance Programming in Physical Dosimetry
 - 1.10.1. Responsibilities
 - 1.10.2. Requirements in External Radiotherapy
 - 1.10.3. Quality Assurance Programming Clinical and Physical Aspects
 - 1.10.4. Maintenance of Quality Control Program

“ *You will expand your professional practice and will be able to apply disruptive procedures in each of your consultations. 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 External Radiotherapy in Physical Dosimetry 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 External Radiotherapy in Physical Dosimetry** 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 certificate 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 External Radiotherapy in Physical Dosimetry**

Official N° of Hours: **150 h.**



*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.

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 Certificate

Radiophysics in External
Radiotherapy in Physical
Dosimetry

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