

Postgraduate Certificate

Radiophysics in External Radiotherapy in Proton Therapy



Postgraduate Certificate Radiophysics in External Radiotherapy in Proton Therapy

- » Modality: online
- » Duration: 6 weeks
- » Certificate: TECH Global University
- » Credits: 6 ECTS
- » Schedule: at your own pace
- » Exams: online

Website: www.techtute.com/us/medicine/postgraduate-certificate/radiophysics-external-radiotherapy-proton-therapy

Index

01

Introduction

p. 4

02

Objectives

p. 8

03

Course Management

p. 12

04

Structure and Content

p. 16

05

Methodology

p. 20

06

Certificate

p. 28

01

Introduction

The physical properties of protons present numerous advantages for the for the treatment of various types of cancer. In this way, proton therapy has become the safest technique for treating pathologies such as ocular tumors or genetic syndromes. The excellent results of this procedure have led to a high demand for professionals specialized in this field. To take advantage of this range of opportunities, experts must have a thorough mastery of the particularities of this radiotherapeutic method. In addition, they must be at the forefront of technology in the healthcare field in order to provide the most innovative services. In this sense, TECH has developed this pioneering program, in 100% online mode and aimed at physicians who want to acquire skills of excellence and based on the latest scientific evidence.





“

You will master the keys to the operation of the BOLUS device to homogenize the radiation dose and protect the most sensitive organs through this 100% online university program"

Radiation protection in medical Protontherapy is vital to ensure the safety of patients and medical staff during the administration of this kind of ionizing radiation. In line with this, experts must have safe facilities and implement access controls for their proper implementation. However, the immediacy with which physicians operate, together with new protocols, can lead to small errors during new protocols can trigger small errors during therapies that can have major consequences. For example, failure to dispose of radioactive waste effectively can cause harmful exposures to the health of the general public. Or even this could lead to regulatory and legal sanctions for healthcare entities.

Aware of this reality, TECH has implemented a groundbreaking program that will delve into the equipment for radiological protection. Designed by a first class teaching staff, the curriculum will analyze the biological and physical effects of Proton Therapy. It will also delve into the dosimetric implications as well as image-guided treatments. In addition, the clinical implications of the application of protons in oncological treatments. The didactic contents will also delve into absolute dosimetry measurements, taking into account the parameters of the beams. In this way, graduates will acquire an integral vision and specialized knowledge in the field of radiological protection.

On the other hand, TECH offers a 100% online educational environment, adapted to the needs of physicians seeking to advance their careers. In addition, it will employ the *Relearning* methodology, based on the repetition of key concepts to fix knowledge in a fast and comfortable way. In this way, the combination of flexibility and a robust pedagogical approach makes it highly accessible. In addition, students will have access to a library with a variety of multimedia resources in different formats such as interactive summaries, explanatory videos and infographics.

This **Postgraduate Certificate in Radiophysics in External Radiotherapy in Proton Therapy** contains the most complete and up-to-date scientific program on the market.

Its most notable features are:

- ♦ 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 expand your knowledge on the use of high energy linear accelerators for the production of neutrons and their safe activation in different treatments"

“

Do you want to specialize in the application of protons in your oncology treatments? Get it through the 180 hours of study offered by this advanced program”

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.

You will analyze the biological effects of Proton Therapy through TECH, the best digital university in the world according to Forbes.

You will achieve your medical-professional goals thanks to the best didactic tools, including explanatory videos and interactive summaries.



02 Objectives

This curriculum will provide students with the keys to address the interactions of protons with matter. Also, students will evaluate the necessary requirements for this radiotherapy technique, being aware of the impact it will have on patients. In this way, graduates will be able to develop the most relevant and advanced physical aspects of the Proton Therapy beam for greater precision in doses.





“

You will handle the most advanced technologies, such as dosimetric equipment and guarantee the quality of life of your patients"



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

- Analyze proton beams and their clinical use
- Evaluate the necessary requirements for the characterization of this radiotherapy technique
- Establish the differences of this modality with conventional radiotherapy both technologically and clinically



You will acquire skills through case studies and clinical experiences to understand how Proton Therapy is used in real situations"

03

Course Management

The faculty of this program is made up of distinguished professionals carefully selected by TECH. This team stands out for their extensive knowledge in Proton Therapy, after successfully applying this technique in certain clinical cases of cancer. In this sense, these professionals have extensive professional experience after having worked in renowned hospitals. Thanks to this, the didactic resources of this program offer the most modern tools available on the healthcare technology market. In this way, the program ensures that graduates have up-to-date and relevant knowledge to apply in their procedures with immediate effect.





“

The specialized teaching staff of this program will allow you to delve deeper into the interactions of protons with matter and their implications in quality processes”

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. Irazola Rosales, Leticia

- ◆ Specialist in Hospital Radiophysics
- ◆ Physician in Hospital Radiophysics at the Biomedical Research Center of La Rioja
- ◆ Working group on Lu-177 treatments at the Spanish Society of Medical Physics (SEFM)
- ◆ Collaborator in the University of Valencia
- ◆ Reviewer of the journal Applied Radiation and Isotopes
- ◆ International Ph.D. in Medical Physics, University of Seville
- ◆ Master's Degree in Medical Physics from the University of Rennes I
- ◆ Degree in Physics from the Universidad de Zaragoza
- ◆ Member of: European Federation of Organisations in Medical Physics (EFOMP) and Spanish Society of Medical Physics (SEFM)



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

The present academic itinerary will focus on the interaction of protons with matter, addressing its implications in measurement processes. Designed by an experienced teaching team, the syllabus will delve into the physical and radiobiological basis of proton therapy. In addition, the program will delve into the parameters of proton beams, as well as planning and calculation algorithms. In addition, the program will promote the installation of elements that favor radiological protection for both patients and healthcare professionals.





“

You will acquire specialized knowledge for clinical practice in the different areas where ionizing radiation is present”

Module 1. Advanced Radiotherapy Method. Proton Therapy

- 1.1. Proton Therapy Radiotherapy with Protons
 - 1.1.1. Interaction of Protons with Matter
 - 1.1.2. Clinical Aspects of Proton Therapy
 - 1.1.3. Physical and Radiobiological Basis of Proton Therapy
- 1.2. Equipment in Proton Therapy
 - 1.2.1. Facilities
 - 1.2.2. Components in Proton Therapy Systems
 - 1.2.3. Physical and Radiobiological Basis of Proton Therapy
- 1.3. Proton Beam
 - 1.3.1. Parameters.
 - 1.3.2. Clinical Implications
 - 1.3.3. Application in Oncological Treatments
- 1.4. Physical Dosimetry in Proton Therapy
 - 1.4.1. Absolute Dosimetry Measurements
 - 1.4.2. Beam Parameters
 - 1.4.3. Materials in Physical Dosimetry
- 1.5. Clinical Dosimetry in Proton Therapy
 - 1.5.1. Application of Clinical Dosimetry in Proton Therapy
 - 1.5.2. Planning and Calculation Algorithms
 - 1.5.3. Imaging Systems
- 1.6. Radiological Protection in Proton Therapy Procedures
 - 1.6.1. Design of an Installation
 - 1.6.2. Neutron Production and Activation
 - 1.6.3. Activation
- 1.7. Proton Therapy Treatments
 - 1.7.1. Image-Guided Treatment
 - 1.7.2. In Vivo Treatment Verification
 - 1.7.3. BOLUS Usage





- 1.8. Biological Effects of Proton Therapy
 - 1.8.1. Physical Aspects
 - 1.8.2. Radiobiology
 - 1.8.3. Dosimetric Implications
- 1.9. Measuring Equipment in Proton Therapy
 - 1.9.1. Dosimetric Equipment
 - 1.9.2. Radiation Protection Equipment
 - 1.9.3. Personal Dosimetry
- 1.10. Uncertainties in Proton Therapy
 - 1.10.1. Uncertainties Associated with Physical Concepts
 - 1.10.2. Uncertainties Associated with the Therapeutic Process
 - 1.10.3. Advances in Proton Therapy

“

Increase your confidence in clinical decision-making by updating your knowledge through this advanced program”

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.



“

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.

“

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 Proton Therapy guarantees students, in addition to the most rigorous and up-to-date education, access to a Postgraduate Certificate issued by TECH Global University.



“

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

This program will allow you to obtain your **Postgraduate Certificate in Radiophysics in External Radiotherapy in Proton Therapy** endorsed by **TECH Global University**, the world's largest online university.

TECH Global University is an official European University publicly recognized by the Government of Andorra ([official bulletin](#)). Andorra is part of the European Higher Education Area (EHEA) since 2003. The EHEA is an initiative promoted by the European Union that aims to organize the international training framework and harmonize the higher education systems of the member countries of this space. The project promotes common values, the implementation of collaborative tools and strengthening its quality assurance mechanisms to enhance collaboration and mobility among students, researchers and academics.

This **TECH Global University** title is a European program of continuing education and professional updating that guarantees the acquisition of competencies in its area of knowledge, providing a high curricular value to the student who completes the program.

Title: **Postgraduate Certificate in Radiophysics in External Radiotherapy in Proton Therapy**

Modality: **online**

Duration: **6 weeks**

Accreditation: **6 ECTS**



*Apostille Convention. In the event that the student wishes to have their paper diploma issued with an apostille, TECH Global University 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
development language
virtual classroom



Postgraduate Certificate
Radiophysics in External
Radiotherapy in Proton
Therapy

- » Modality: online
- » Duration: 6 weeks
- » Certificate: TECH Global University
- » Credits: 6 ECTS
- » Schedule: at your own pace
- » Exams: online

Postgraduate Certificate

Radiophysics in External Radiotherapy in Proton Therapy

