

Postgraduate Certificate

Radiophysics in External Radiotherapy in Clinical Dosimetry



Postgraduate Certificate Radiophysics in External Radiotherapy in Clinical Dosimetry

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

Website: www.techtute.com/us/nursing/postgraduate-certificate/radiophysics-external-radiotherapy-clinical-dosimetry

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01

Introduction

Tumor diseases constitute one of the highest mortality rates globally. Therefore, healthcare professionals need to carefully plan the treatments to be administered to patients using advanced and conventional Clinical Dosimetry techniques. However, the challenge of creating personalized procedures based on the individual characteristics of each patient is increasing and nurses play a crucial role in the development of personalized care. In view of this, TECH implements a 100% online program that provides its students with an exhaustive analysis of the most innovative treatment planning systems. In this way, nursing staff can achieve excellence in this area.



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You will delve into the most advanced tools to evaluate External Radiation Therapy planning throughout this exhaustive academic itinerary"

Technological development in the healthcare field has allowed External Radiation Therapy to be enriched with new tools with which to administer radiation doses with high precision. 3D Radiotherapy (RT3D) is one of the latest trends in Clinical Dosimetry. This procedure has many advantages, including a more detailed visualization of the tumor and its relationship with other organs. Moreover, three-dimensional images are useful for monitoring the administration of irradiation in real time, which helps to make adjustments to therapies. For this reason, all healthcare personnel must be properly specialized in its advantages. In particular, nurses must be up to date in order to contribute to the development of therapeutic procedures in the most efficient way.

In order for these professionals to master the applications of the innovative technologies at their disposal, TECH will ensure a comprehensive study. With its very complete syllabus, nurses will learn the basics of the most advanced Expert Radiotherapy procedures. Likewise, the curriculum, developed by an educated teaching team, will delve into intensity-modulated therapies. In this way, the academic itinerary will analyze in depth factors such as optimization and specific quality control. This will ensure that graduates can keep abreast of how vital organ functions are preserved beyond radiation. Also, the teaching materials of this university program will allow students to stay at the forefront of health technology, differentiating modern tools including Linear Electron Accelerators.

In addition, the training is based on the Relearning method, of which TECH is a pioneer. This system uses the reiteration of key contents in a natural way, ensuring that they remain in the students' memory without the need to memorize. It should be noted that the only thing required to access the Virtual Campus is a device with Internet access (such as cell phones, tablets or computers). In addition, students will be able to access a digital library full of additional didactic materials to enrich their educational experience.

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



In your practice as a Nuclear Medicine nurse you will need to be up to date on advanced intensity modulated treatments. Achieve this in as little as 6 weeks with this TECH program”

“*You will delve into dose-volume histograms and you will collaborate with the physician in the recording of adverse effects after studying this Postgraduate Certificate*”

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 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 delve into dose calculation models to be aware of their usefulness and value in the Monitor Units of cancer patients under your care.

With the Relearning system, of which TECH is a pioneer, you will enjoy a flexible and effective learning experience.



02

Objectives

This academic itinerary will allow the students to establish the different stages in the treatment of External Radiotherapy, from simulation to periodic controls in patient therapies. In this way, the graduates will carry out effective quality controls of the planning systems. In turn, these specialists will carry out metrics with which they will certify the effects of the treatments and will be able to take the necessary measures to improve the medical condition of the users.



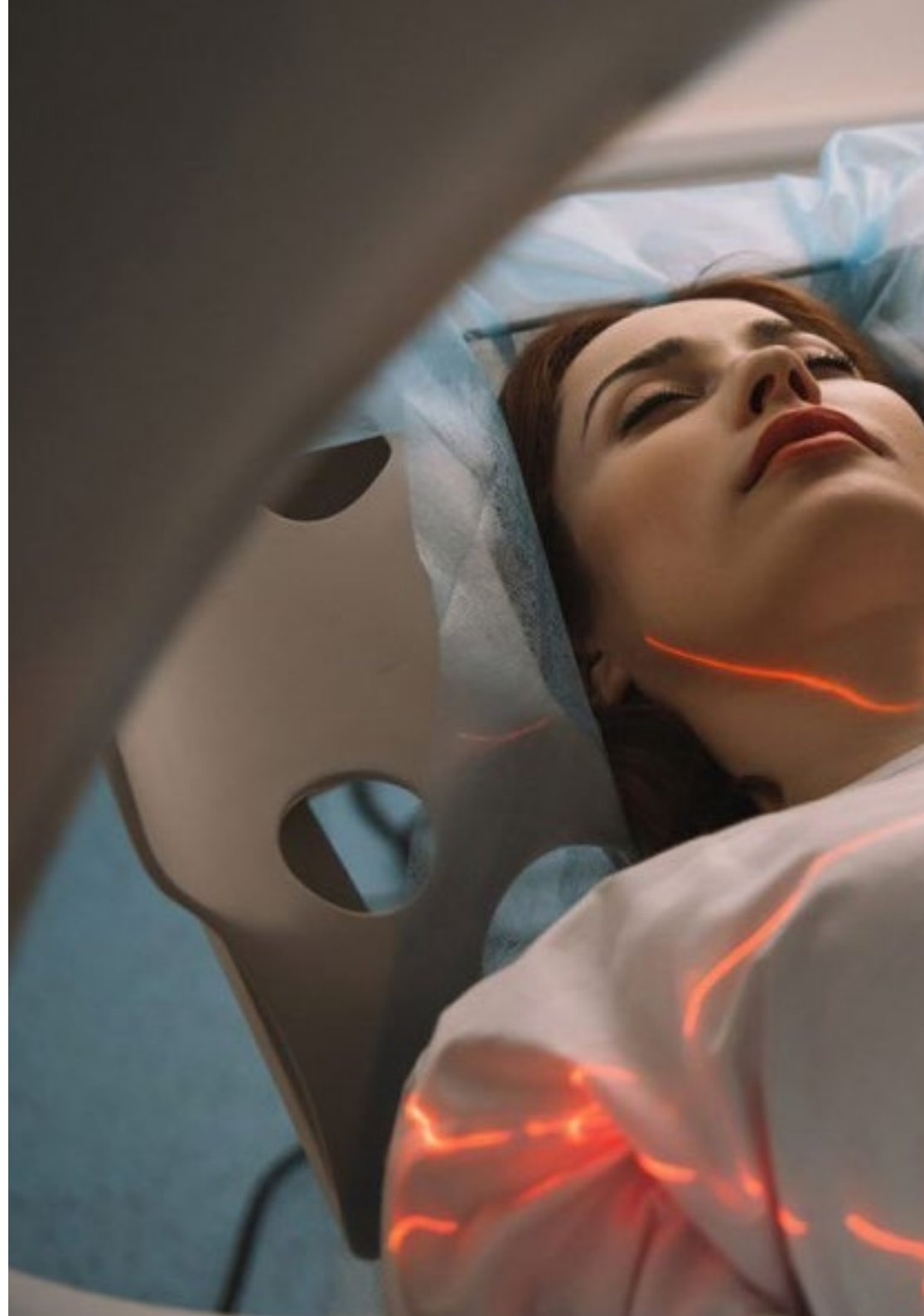
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A university program that will offer multiple case studies so that you can develop your studies as if you were facing real situations”



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 planning techniques for external radiotherapy treatments
- ♦ 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

- Specify the different characteristics of the different types of external radiotherapy treatments
- Analyze the different verification systems of external radiotherapy plans, as well as the metrics used

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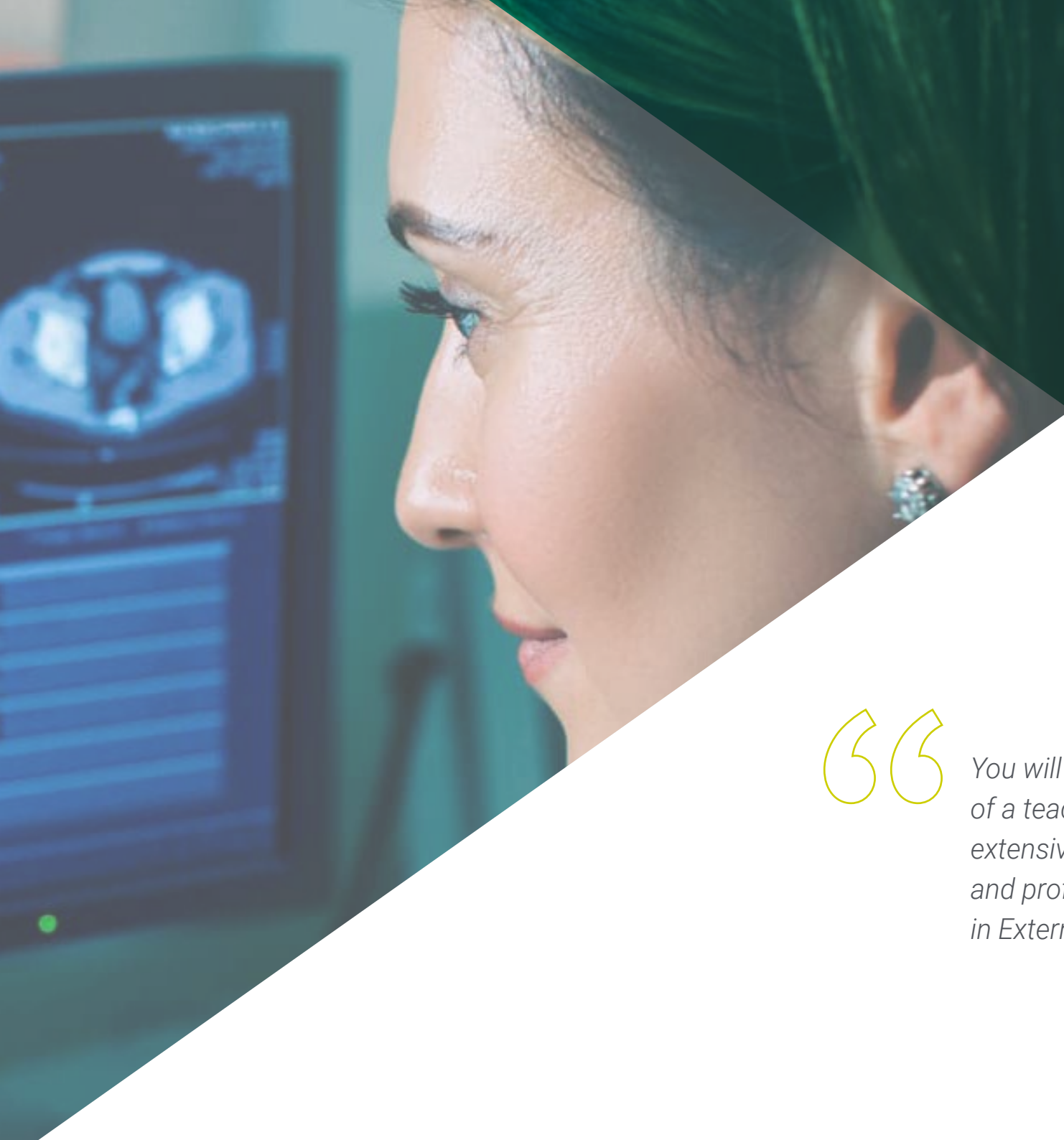
You will have access to the contents from any fixed or portable device with an Internet connection, even from your cell phone”

03

Course Management

In its firm commitment to offer the most updated and complete academic program, TECH has carefully assembled a group of professionals belonging to the radiophysics sector. With many years of experience behind them, the faculty brings a innovative approach to the treatment of patients with External Radiotherapy. For this reason, the program provides students with the most effective resources to ensure the correct delivery of the desired doses to patients. In this way, the graduates will apply the most advanced Clinical Dosimetry techniques to their work practice and will be able to experience a leap in quality.





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You will have the support of a teaching staff with an extensive career in research and professional application in External Radiation Therapy”

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. 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

Ms. Milanés Gaillet, Ana Isabel

- ◆ Radiophysicist at the University Hospital 12 de Octubre
- ◆ Medical Physicist at the Beata María Ana Hospital of Hermanas Hospitalarias
- ◆ Expert in Radiological Anatomy and Physiology from the Spanish Society of Medical Physics
- ◆ Expert in Medical Physics from the International University of Andalusia
- ◆ Degree in Physics from the Autonomous University of Madrid



04

Structure and Content

This study plan will cover from the planning stage to the verification of patient dose delivery. Designed by an experienced faculty, the syllabus will delve into the different stages of Clinical Dosimetry, emphasizing the simulation stages for the protection of healthy tissues. Likewise, the materials will provide a clear distinction of the factors involved in dose distribution. In this line, it will provide the keys for the manual calculation of monitor units. In this way, graduates will maximize the effectiveness of treatments while reducing side effects.





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*A complete and updated syllabus,
configured as a high qualification tool for
you to acquire a prominent as a nurse”*

Module 1. External Radiotherapy. Clinical Dosimetry

- 1.1. Clinical Dosimetry in External Radiotherapy
 - 1.1.1. Clinical Dosimetry in External Radiotherapy
 - 1.1.2. Treatment in External Radiotherapy
 - 1.1.3. Beam Modifying Elements
- 1.2. Stages of Clinical Dosimetry of External Radiotherapy
 - 1.2.1. Simulation Stage
 - 1.2.2. Treatment Planning.
 - 1.2.3. Treatment Verification
 - 1.2.4. Linear Electron Accelerator Treatment
- 1.3. Treatment Planning Systems in External Radiotherapy
 - 1.3.1. Models in Planning Systems
 - 1.3.2. Calculating Algorithms
 - 1.3.3. Utilities of Planning Systems
 - 1.3.4. Imaging Tools for Planning Systems
- 1.4. Quality Control of Planning Systems in External Radiotherapy
 - 1.4.1. Quality Control of Planning Systems in External Radiotherapy
 - 1.4.2. Initial Reference State
 - 1.4.3. Periodic Controls
- 1.5. Manual Calculation of Monitor Units (MUs)
 - 1.5.1. Manual Control of MUs
 - 1.5.2. Intervening Factors in Dose Distribution
 - 1.5.3. Practical Example of Calculation of MUs
- 1.6. Conformal 3D Radiotherapy Treatments
 - 1.6.1. 3D Radiotherapy (RT3D)
 - 1.6.2. Photon Beam RT3D Treatments
 - 1.6.3. Electron Beam RT3D Treatments
- 1.7. Advanced Intensity Modulated Treatments
 - 1.7.1. Modulated Intensity Treatments
 - 1.7.2. Optimization
 - 1.7.3. Specific Quality Control





- 1.8. Evaluation of External Radiation Therapy Planning
 - 1.8.1. Dose-volume Histogram
 - 1.8.2. Conformation Index and Homogeneity Index
 - 1.8.3. Clinical Impact of the Planning
 - 1.8.4. Planning Errors
- 1.9 Advanced Special Techniques in External Radiotherapy
 - 1.9.1. Radiosurgery and Extracranial Stereotactic Radiotherapy
 - 1.9.2. Total Body Irradiation
 - 1.9.3. Total Body Surface Irradiation
 - 1.9.4. Other Technologies in External Radiotherapy
- 1.10. Verification of Treatment Plans in External Radiotherapy
 - 1.10.1. Verification of Treatment Plans in External Radiotherapy
 - 1.10.2. Treatment Verification Systems
 - 1.10.3. Treatment Verification Metrics

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With the best-rated study aids in online teaching, this program will allow you to make unstoppable progress in your professional growth. Don't wait any longer and enroll"

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 Nursing School we use the Case Method

In a given situation, what should a professional do? 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. Nurses learn better, faster, and more sustainably over time.

With TECH, nurses can experience a learning methodology 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, in an attempt to recreate the real conditions in professional nursing 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. Nurses who follow this method not only grasp concepts, but also develop their mental capacity, by evaluating real situations and applying their knowledge.
2. The learning process has a clear focus on practical skills that allow the nursing professional to better integrate knowledge acquisition into the hospital setting or primary care.
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 case studies with a 100% online learning system based on repetition combining a minimum of 8 different elements in each lesson, which is a real revolution compared to the simple study and analysis of cases.



The nurse will learn through real cases and by solving 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 we have trained more than 175,000 nurses with unprecedented success in all specialities regardless of practical workload. 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 really 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.



Nursing Techniques and Procedures on Video

We introduce you to the latest techniques, to the latest educational advances, 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 them as many times as you want.



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 suggesting that observing third-party experts can be useful.

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





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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 Clinical Dosimetry** 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 Clinical Dosimetry**

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

tech global
university

personalized service innovation

knowledge present
online training
development language
classroom

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