

# Postgraduate Certificate

## Radiophysics in Intraoperative Radiotherapy





## Postgraduate Certificate Radiophysics in Intraoperative Radiotherapy

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

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# 01

# Introduction

According to the World Health Organization, breast cancer has affected more than 2 million people during the last two decades. In this context, Intraoperative Radiotherapy has become a key technique to combat it. This instrument provides advantages such as reduced irradiation of the surrounding tissue and thus reduces the risk of toxicity. Aware that this is an effective procedure, experts are increasingly demanding academic studies to specialize in this field. In response to this, TECH has developed the most complete and up to date academic program, thus contributing to the update of physicians in an optimal way and through a disruptive 100% online modality.





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*You will increase your skills for the handling of the main intraoperative imaging systems and control tumor resection during oncological surgeries thanks to TECH"*

*Flash* technology has become the latest trend in Intraoperative Radiation Therapy. It is a technique that uses ultra-fast beams of radiation to treat tumors. Among its benefits, it significantly reduces side effects and toxicity in the tissues surrounding the tumor. In addition, its procedures reduce the influence of involuntary patient movements during irradiation, which significantly improves the precision of treatment. It should be noted, however, that although the preliminary results of this tool are promising, it is still in the research and development stage.

In view of this situation, TECH has implemented a Postgraduate Certificate that will help doctors to acquire advanced knowledge on this subject and to promote new scientific research for the consolidation of this useful system. Developed by a prestigious teaching team, this curriculum will deal with the use of new emerging therapies in Intraoperative Radiotherapy. For this purpose, the syllabus will provide specialists with the guidelines to handle modern technologies such as computed tomography. Likewise, the program will delve into the different clinical indications according to the types of cancer treated. In addition, it will enhance effective communication with patients and their families in complex situations.

On the other hand, the program is based on the revolutionary *Relearning* method. This learning system consists of the gradual and organized repetition of the most relevant contents, so that they remain engraved in the memory of the students 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) and additional didactic materials such as complementary readings. In this way, students will consolidate their knowledge in a more dynamic way.

This **Postgraduate Certificate in Radiophysics in Intraoperative Radiotherapy** 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 plan the most appropriate treatments in Radiotherapy? Specialize in volumetry and delineation of organs at risk with this exclusive program"*

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*You will master the most effective procedures for postoperative follow-up of patients undergoing interoperative radiotherapy"*

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 throughout the program. For this purpose, the students will be assisted by an innovative interactive video system created by renowned and experienced experts.

*You will develop optimal delivery strategies for calculating radiation dose during treatments.*

*Interactive summaries of each topic will allow you to consolidate in a more dynamic way the concepts on techniques and of administration of radiation during surgeries.*



# 02 Objectives

Throughout 6 intensive weeks, physicians will delve into the fundamental principles of Intraoperative Radiation Therapy, highlighting its clinical utility in cancer treatments. In this line, graduates will effectively use the most innovative technologies to obtain the most accurate diagnoses and apply the most appropriate treatments according to the patients' needs. They will also be able to analyze in detail the methods of calculating doses and will promote measures to ensure safe working environments.





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*You will broaden your professional horizons thanks to this first-class educational experience in the in the field of Intraoperative Radiation Therapy. Enroll now!”*



## 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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- Identify the main clinical indications for the application of intraoperative radiotherapy
- Analyze in detail the methods of dose calculation in intraoperative radiotherapy
- Examine the factors influencing patient and medical staff safety during intraoperative radiotherapy procedures



*Stay on the cutting edge of technology and master mobile linear accelerators thanks to this 100% online university program"*

# 03

# Course Management

This Postgraduate Certificate is designed following the guidelines of a group of specialists. The teachers who are part of this university program have extensive professional experience, having worked in prestigious institutions in the health sector. These professionals will provide students with various teaching materials, with which graduates will delve into the execution of intraoperative radiotherapy and acquire skills to practice their professional practice optimally.



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*You will be introduced to a curriculum designed by a renowned teaching staff, which will guarantee you a successful learning process"*

## 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)



# 04

## Structure and Content

The present study plan delves into Intraoperative Radiotherapy, considered the most advanced technique for dealing with types of cancer in a highly precise manner. With the support of an experienced teaching group, the syllabus will delve into the most advanced technology in this health field (among which mobile linear accelerators stand out). Likewise, the didactic materials will address dose calculations and treatment planning, based on safe methodologies that guarantee the accuracy of radiation delivery.



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*A high-intensity program that will allow students to advance quickly and efficiently in the acquisition of medical competencies”*

## Module 1. Advanced Radiotherapy Method. Intraoperative Radiotherapy

- 1.1. Intraoperative Radiotherapy
  - 1.1.1. Intraoperative Radiotherapy
  - 1.1.2. Current Approach to Intraoperative Radiotherapy
  - 1.1.3. Intraoperative Radiotherapy versus Conventional Radiotherapy
- 1.2. Technology in Intraoperative Radiotherapy
  - 1.2.1. Mobile Linear Accelerators in Intraoperative Radiotherapy
  - 1.2.2. Intraoperative Imaging Systems
  - 1.2.3. Quality Control and Maintenance of Equipment
- 1.3. Treatment Planning Systems in Intraoperative Radiotherapy
  - 1.3.1. Dose Calculation Methods
  - 1.3.2. Volumetry and Delineation of Organs at Risk
  - 1.3.3. Dose Optimization and Fractionation
- 1.4. Clinical Indications and Patient Selection for Intraoperative Radiotherapy
  - 1.4.1. Types of Cancer Treated with Intraoperative Radiotherapy
  - 1.4.2. Assessment of Patient Suitability
  - 1.4.3. Clinical Studies and Discussion
- 1.5. Surgical Procedures in Intraoperative Radiotherapy
  - 1.5.1. Surgical Preparation and Logistics
  - 1.5.2. Radiation Administration Techniques During Surgery
  - 1.5.3. Postoperative Follow-up and Patient Care
- 1.6. Calculation and Administration of Radiation Dose for Intraoperative Radiotherapy
  - 1.6.1. Formulas and Dosis Calculation Algorithms
  - 1.6.2. Dose Correction and Adjustment Factors
  - 1.6.3. Real-time Monitoring during Surgery
- 1.7. Radiation Protection and Safety in Intraoperative Radiotherapy
  - 1.7.1. International Radiation Protection Standards and Regulations
  - 1.7.2. Safety Measures for the Medical Staff and the Patient
  - 1.7.3. Risk Mitigation Strategies



- 1.8. Interdisciplinary Collaboration in Intraoperative Radiotherapy
  - 1.8.1. Role of the Multidisciplinary Team in Intraoperative Radiotherapy
  - 1.8.2. Communication between Radiation Therapists, Surgeons and Oncologists
  - 1.8.3. Practical Examples of Interdisciplinary Collaboration
- 1.9. Flash Technique. Latest Trend in Intraoperative Radiotherapy
  - 1.9.1. Research and Development in Intraoperative Radiotherapy
  - 1.9.2. New Technologies and Emerging Therapies in Intraoperative Radiotherapy
  - 1.9.3. Implications for Future Clinical Practice
- 1.10. Ethics and Social Aspects in Intraoperative Radiotherapy
  - 1.10.1. Ethical Considerations in Clinical Decision-Making
  - 1.10.2. Access to Intraoperative Radiotherapy and Equity of Care
  - 1.10.3. Communication with Patients and Family in Complex Situations

“*You will boost interdisciplinary collaboration in the planning and execution of Intraoperative Radiotherapy treatments thanks to this TECH academic pathway. Don't wait any longer and join 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.*



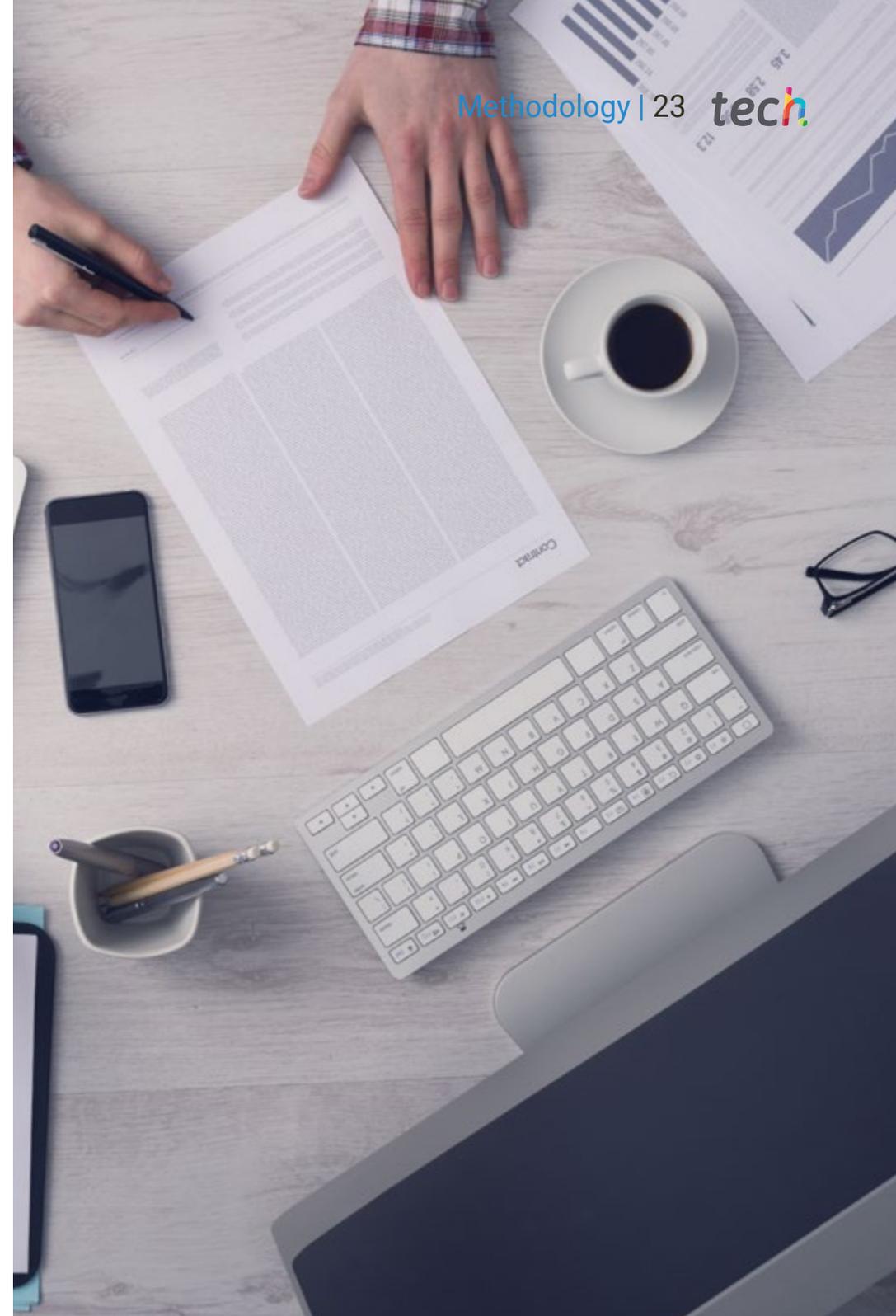
According to Dr. Gérvas, the clinical case is the annotated presentation of a patient, or group of patients, which becomes a "case", an example or model that illustrates some peculiar clinical component, either because of its teaching power or because of its uniqueness or rarity. It is essential that 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 Intraoperative Radiotherapy 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 Intraoperative Radiotherapy** 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 Intraoperative Radiotherapy**

Modality: **online**

Duration: **6 weeks**

Accreditation: **6 ECTS**





**Postgraduate Certificate**  
Radiophysics in Intraoperative  
Radiotherapy

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

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