Postgraduate Certificate

Radiophysics in Radiobiology

tech global university

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Postgraduate Certificate

Radiophysics in Radiobiology

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

Website: www.techtitute.com/us/medicine/postgraduate-certificate/radiophysics-radiobiology

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Introduction

Cancer is the leading cause of death in the world. In recent years, this disease has killed 10 million people. Aware of this, scientists have invested a great deal of their time in developing new therapies with the help of the most modern technology in the healthcare field. One of the latest research achievements is brachytherapy. This procedure, which consists of placing radioactive sources directly on tumors, has advantages such as greater dose precision and less damage to surrounding tissues. In view of this, TECH is developing a 100% online program that will delve into the latest innovations in this type of treatment through a disruptive 100% online methodology.

An academic option with a theoretical and practical approach that will lead you to master the interaction of radiation with organic tissues from a medical point of view"

In the context of Radiotherapy, it is essential for physicians to control the most advanced technological variables in order to design treatments effectively. To this end, these specialists must constantly update their knowledge in order to apply new protocols with which to direct radiation more precisely to the cancerous cells. In this way, they will be able to minimize damage to normal tissues and avoid adverse reactions in common pathologies such as breast or prostate carcinoma. However, the constant evolution of medicine, together with changes in clinical practice guidelines, make it difficult for health professionals to keep abreast of all the latest developments in Radiobiology.

For this reason, TECH has implemented this Postgraduate Certificate complete and updated academic market for the specialist to deepen and broaden their skills about the interaction of ionizing radiation with biological tissues. In line with this, the syllabus will address in detail the most effective methods for the repair of the damage in the molecules of the DNA. In addition, the teaching materials will analyze biological efficacy in terms of factors that alter radiosensitivity, such as the case of oxygenation status. On the other hand, it will highlight the relevance of Nuclear Medicine to diagnose and treat pathologies through the injection of radiopharmaceuticals by means of a gamma camera.

In addition, this academic itinerary will have a 100% online methodology, so that the physician can develop it with total comfort. In this way, the only thing they will need is a device with Internet access to expand their knowledge and acquire new skills that will enrich their professional practice. In this sense, the program will guarantee the most avant-garde methodology: Relearning. This teaching system, based on the reiteration of the most important contents in a gradual way, will provide an update at a natural, flexible and efficient pace.

This **Postgraduate Certificate in Radiophysics in Radiobiology** 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
- Graphic, schematic, and practical contents which provide scientific and practical information on the disciplines that are essential for professional practice
- Practical exercises where self-assessment can be used 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 cover the main mathematical models of survival to understand how cells respond to ionizing factors that can affect their proliferation"

Get up to speed on the dose limits set by the International Commission on Radiological Protection with this 180-hour university program"

A disruptive program that will provide you with the most cutting-edge skills in the management of Radiobiology techniques.

With the Relearning system you will of TECH integrate the concepts in a natural and progressive way. Forget about long hours of memorization!

The program's teaching staff includes professionals from the field who contribute their work experience to this educational 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.

02

Objectives

Throughout the 6 weeks of this program, physicians will acquire broad skills related to the interactions of ionizing radiation with tissues. In this way, they will be able to assess the risks associated with the main medical exposures and establish the cellular response to these effects. In addition, when applying the different treatments, they will take into account existing mathematical models to simulate how radiation will be distributed in the organs during radiotherapy processes.

TECH's priority is to offer you academic excellence and a unique learning experience, which will elevate your professional horizons to a higher level"

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

- Assess the risks associated with the main medical exposures
- Analyze the effects of the interaction of ionizing radiation with tissues and organs
- Examine the different existing mathematical models in radiobiology

You will address the effects of fractionation to minimize the risk of side effects and improve the results of Radiation Therapy"

03

Course Management

TECH's fundamental premise is to offer students the most complete education. For this reason, it has carefully selected the teaching staff that makes up this program. These professionals have extensive professional experience, having worked in renowned health institutions and years of research. Thanks to the knowledge they pour into the didactic materials, students will be able to broaden their understanding while developing new skills to apply in medical practice.

You will have at your disposal a comprehensive curriculum, designed by the best professionals in the field of Radiobiology and Radiophysics"

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

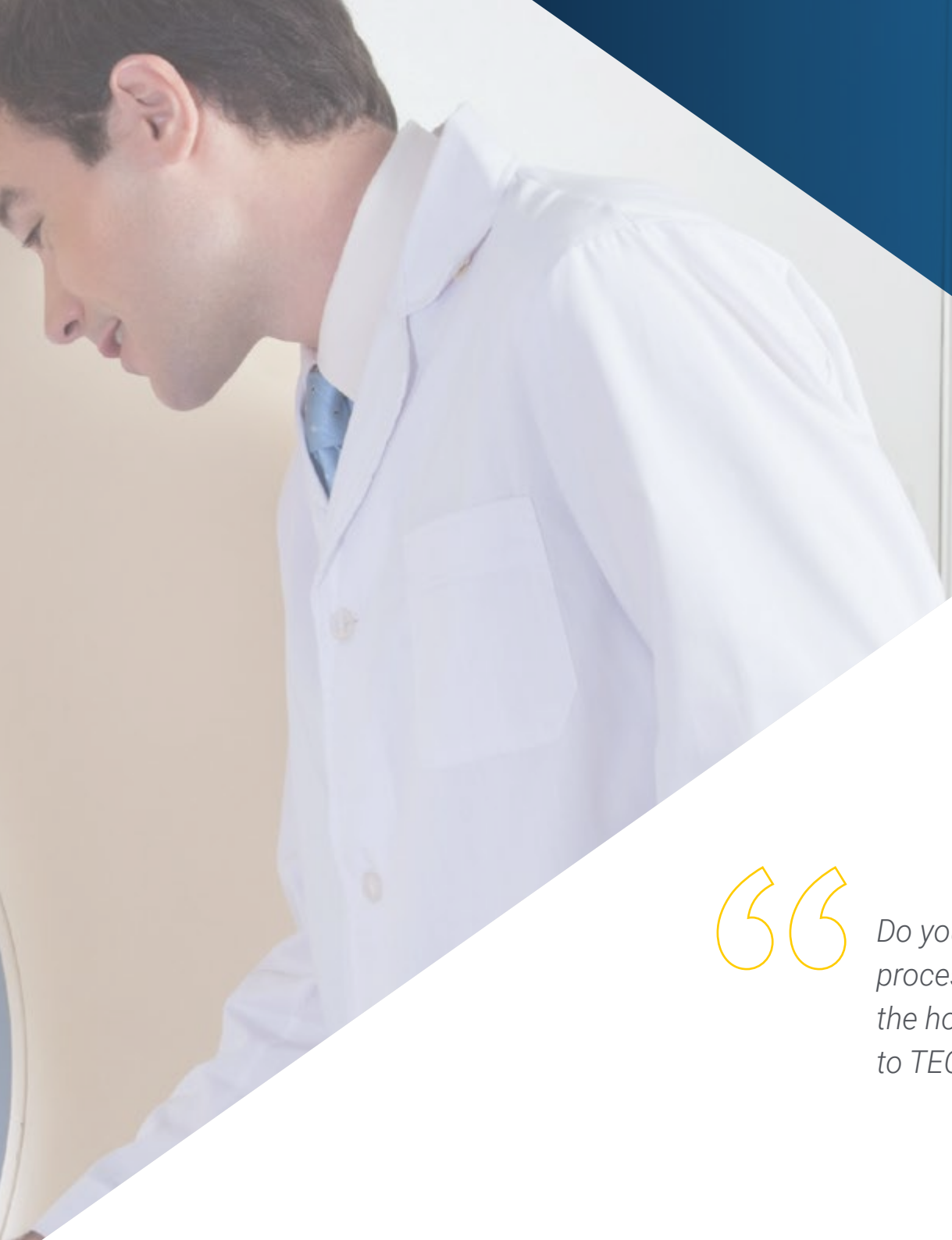
- Specialist in Hospital Radiophysics
- Physician in Hospital Radiophysics at the Biomedical Research Center of La Rioja
- Working group on Lu-177 treatments at the Spanish Society of Medical Physics (SEFM)
- Collaborator in the University of Valencia
- Reviewer of the journal Applied Radiation and Isotopes
- 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

Designed by a first class teaching staff, this syllabus will provide students with advanced knowledge for clinical practice in the different areas where ionizing radiation is present. In this way, the syllabus will delve into the risks associated with this phenomenon, taking into account the factors that alter radiosensitivity. Likewise, the didactic materials will emphasize statistical models in cell survival so that graduates can compare the efficacy of different treatments according to the needs of patients.



Do you want to improve diagnostic processes and radiological safety in the hospital field? Achieve it thanks to TECH"

Module 1. Radiobiology

1.1. Interaction of Radiation with Organic Tissues
- 1.1.1. Interaction of Radiation with Tissues
- 1.1.2. Interaction of Radiation with Cells
- 1.1.3. Physical-Chemical Response

1.2. Effects of Ionizing Radiation on DNA
- 1.2.1. Structure of DNA
- 1.2.2. Radiation-induced Damage
- 1.2.3. Damage Repair

1.3. Effects of Radiation on Organic Tissues
- 1.3.1. Effects on the Cell Cycle
- 1.3.2. Irradiation Syndromes
- 1.3.3. Aberrations and Mutations

1.4. Mathematical Models of Cell Survival
- 1.4.1. Mathematical Models of Cell Survival
- 1.4.2. Alpha-Beta Model
- 1.4.3. Effect of Fractionation

1.5. Efficacy of Ionizing Radiations on Organic Tissues
- 1.5.1. Relative Biological Efficacy
- 1.5.2. Factors Altering Radiosensitivity
- 1.5.3. LET and Oxygen Effect

1.6. Biological Aspects according to the Dose of Ionizing Radiations
- 1.6.1. Radiobiology at Low Doses
- 1.6.2. Radiobiology at High Doses
- 1.6.3. Systemic Response to Radiation

1.7. Estimation of the Risk of Ionizing Radiation Exposure
- 1.7.1. Stochastic and Random Effects
- 1.7.2. Risk Estimation
- 1.7.3. ICRP Dose Limits

1.8. Radiobiology in Medical Exposures in Radiotherapy
- 1.8.1. Isoeffect
- 1.8.2. Proliferation Effect
- 1.8.3. Dose-Response

1.9. Radiobiology in Medical Exposures in Other Medical Exposures
- 1.9.1. Brachytherapy
- 1.9.2. Radiodiagnostics
- 1.9.3. Nuclear Medicine

1.10. Statistical Models in Cell Survival
- 1.10.1. Statistical Models
- 1.10.2. Survival Analysis
- 1.10.3. Epidemiological Studies

You will develop skills through real cases and the analysis of complex situations in simulated learning environments. 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.

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:

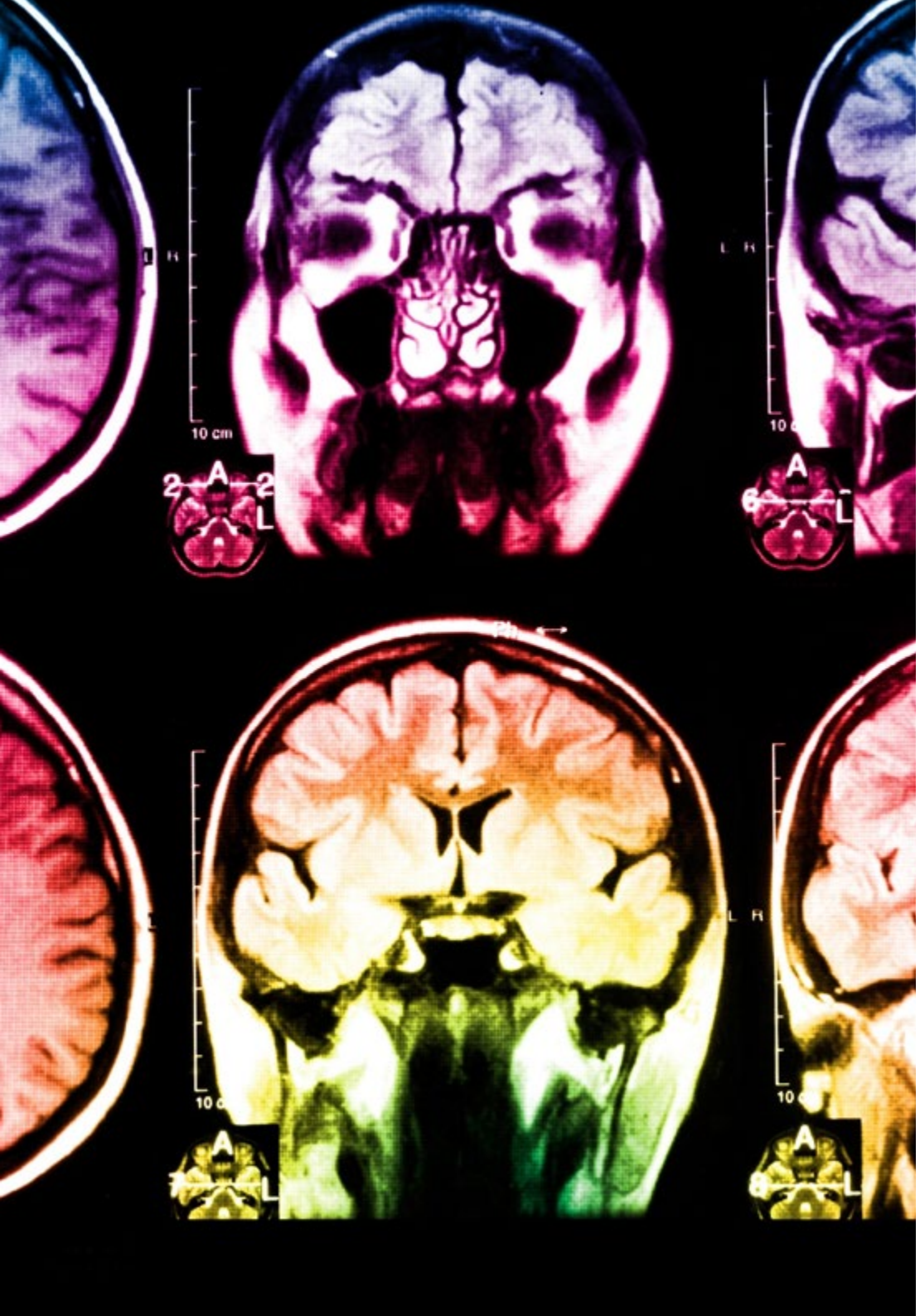
1. Students who follow this method not only achieve the assimilation of concepts, but also a development of their mental capacity, through exercises that evaluate real situations and the application of knowledge.
2. Learning is solidly translated into practical skills that allow the student to better 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.

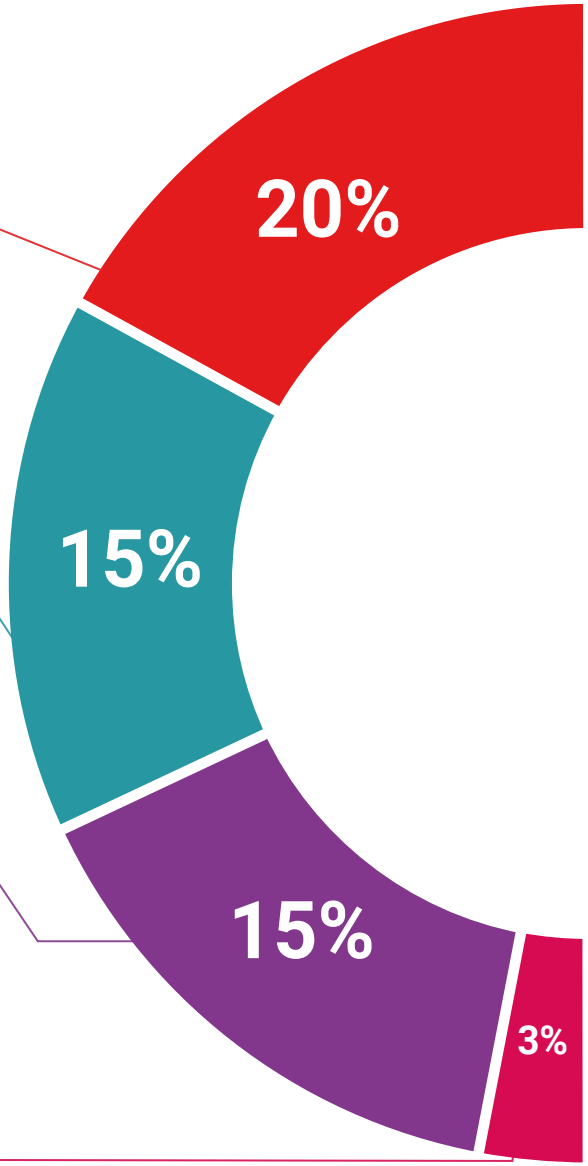
Interactive Summaries

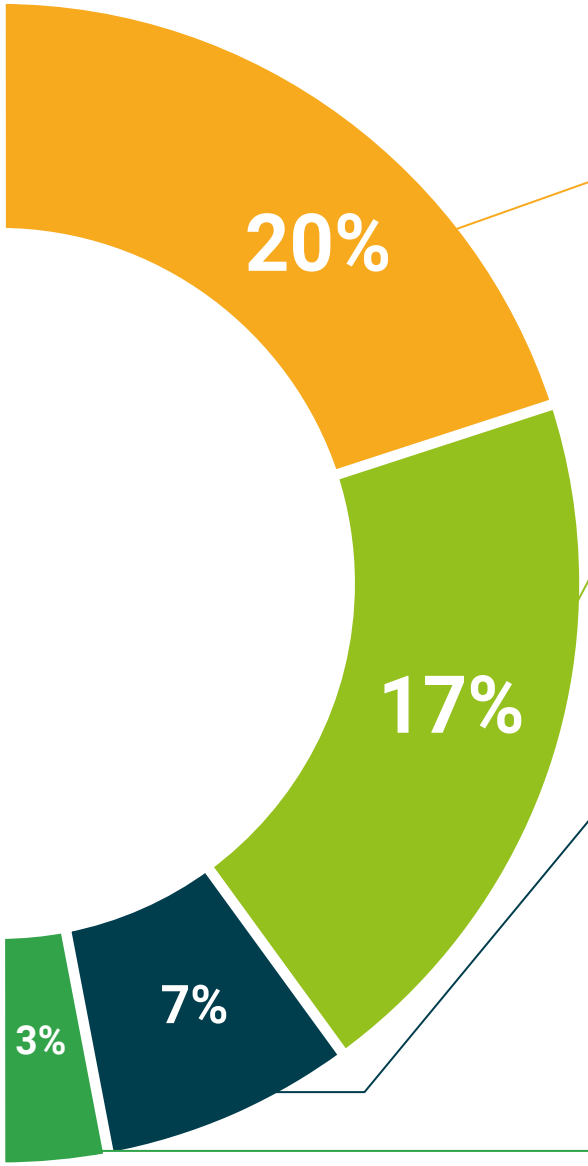
The TECH team presents the contents attractively and dynamically in multimedia lessons that include audio, videos, images, diagrams, and concept maps in order to reinforce knowledge.

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 Radiobiology 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 Radiobiology** 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.

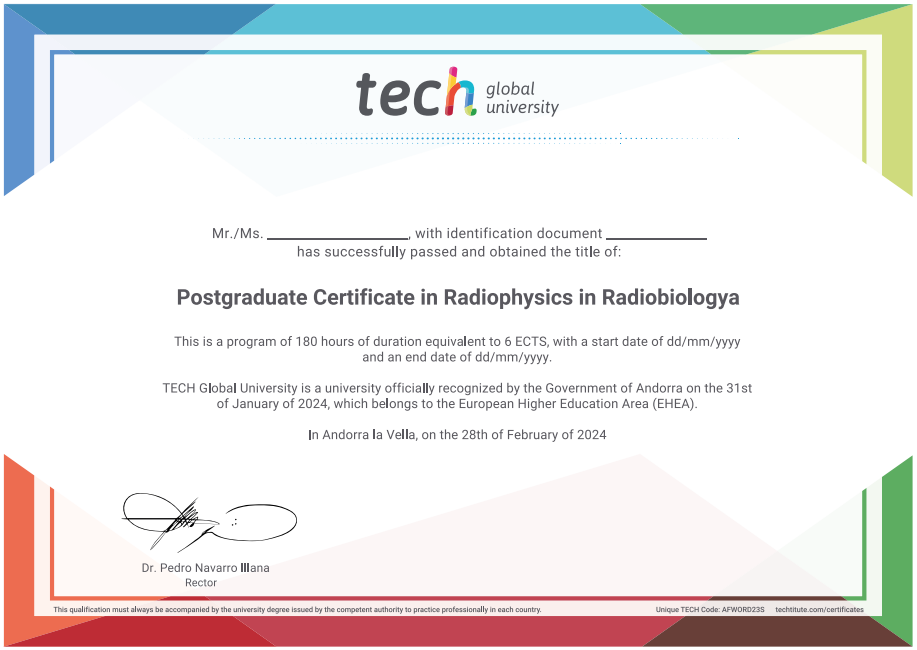
This **TECH Global University** title is a European program of continuing education and professional updating that guarantees the acquisition of competencies in its area of knowledge, providing a high curricular value to the student who completes the program.

Title: **Postgraduate Certificate in Radiophysics in Radiobiology**

Modality: **online**

Duration: **6 weeks**

Accreditation: **6 ECTS**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Mr./Ms. _____, with identification document _____
has successfully passed and obtained the title of:

Postgraduate Certificate in Radiophysics in Radiobiologya

This is a program of 180 hours of duration equivalent to 6 ECTS, with a start date of dd/mm/yyyy and an end date of dd/mm/yyyy.

TECH Global University is a university officially recognized by the Government of Andorra on the 31st of January of 2024, which belongs to the European Higher Education Area (EHEA).

In Andorra la Vella, on the 28th of February of 2024

Dr. Pedro Navarro Illana
Rector

This qualification must always be accompanied by the university degree issued by the competent authority to practice professionally in each country. Unique TECH Code: AFWORD23S techtitute.com/certificates

*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.

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Postgraduate Certificate

Radiophysics in Radiobiology

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