Postgraduate Certificate

Radiophysics in Radiobiology

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Postgraduate Certificate
Radiophysics in Radiobiology

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

Website: **www.techtitute.com/pk/engineering/postgraduate-certificate/radiophysics-radiobiology**

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01

Introduction

The evolution of Radiobiology has allowed a precise understanding of the effects of radiation on living organisms. As a result, innovative anti-cancer technologies and more efficient safety guidelines have been established. At the same time, the calibration of equipment associated with these treatments depends on the most specialized professionals. Engineers are thus obliged to keep up to date with the main advances in this field. For this reason, TECH has developed this study program that delves into the interaction of radiation with organic tissues, its effects on DNA and the calculations necessary to estimate the risk. At the same time, an unparalleled 100% online methodology is implemented for the study of these topics.

You will address the risks derived from the use of ionizing radiation thanks to this 100% online program, flexible and compatible with your other responsibilities"

Radiobiology has made significant advances in understanding the cellular response to radiation, allowing for more precise cancer therapies. On the other hand, it has contributed to the development of Intensity Modulated Radiation Therapy and Radiosurgery techniques, improving efficacy and minimizing side effects. At the same time, scientists have exhaustively investigated the impact on human health of radiation emitted by some of the equipment used by people in their daily lives. As a result of these continuous innovations, engineers need to update their skills holistically. In this way, they can be part of scientific research and the development of tools that, in the medium and long term, contribute to reduce exposure rates.

To contribute to the comprehensive training of these professionals, TECH has an intensive program. This is composed of 10 exhaustive topics where students have at their disposal exclusive contents on Radiobiology in medical exposures in Radiotherapy and other therapeutic procedures. Likewise, mathematical and statistical models of cell survival that must be taken into account for the calibration of these instruments are studied in depth. Also, the university program deals with the characteristics of low and high doses to organic tissues.

On the other hand, in line with the demands of modern professional life, this syllabus is presented in a 100% online modality, providing flexibility for engineers to adjust to their work commitments. In addition, the *Relearning*methodology, based on the repetition of key concepts, not only facilitates the effective assimilation of knowledge, but also fosters lasting learning that is applicable in practical contexts. Through this innovative pedagogical approach, graduates effectively acquire and retain the knowledge essential to excel in Radiophysics in Radiobiology.

This **Postgraduate Certificate in Radiophysics in Radiobiology** contains the most complete and up-to-date program on the market. The most important features include:

- The development of practical cases presented by experts in Radiophysics in Radiobiology
- The graphic, schematic and eminently practical contents with which it is conceived provide updated and practical information on those 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

Forget about memorizing! With the Relearning system you will integrate the concepts in a natural and progressive way"

Boost your career as an engineer through TECH, the world's top-rated university by its students according to the Trustpilot platform (4.9/5)"

This unique program will guarantee you the most disruptive knowledge on Radiobiology in medical exposures in Radiotherapy.

You will update your knowledge through innovative multimedia content with the TECH seal of quality.

The program's teaching staff includes professionals from the industry 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.

02

Objectives

The main objective of the Postgraduate Certificate in Radiophysics in Radiobiology is for graduates to acquire a deep understanding of the effects of the interaction of ionizing radiation with tissues and organs. Aimed specifically at engineering professionals, the program focuses on providing specialized knowledge that allows a precise and detailed understanding of the impacts of radiation on biological systems. With a practical and applied approach, this syllabus equips graduates to address technological and scientific challenges by preparing them for professional success.

You will address the systemic response to radiation in order to incorporate it into your practice and the design of innovative engineering projects in the field of Radiophysics"

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 the measurement of photon and electron beams in external radiation therapy
- 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 oncologic settings
- Analyze the importance of radiation 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 ionizing radiation interaction with tissues and organs
- Examine the various mathematical models available in radiobiology

You will delve into the effects of the interaction of ionizing radiation with tissues and organs and its implications from an engineering point of view thanks to TECH"

03

Course Management

The faculty of this university program has been carefully selected by TECH, selecting the best specialists with an extensive and recognized professional background in the field of Radiophysics. Each member of this faculty has an outstanding track record at the intersection between Engineering and Radiobiology, providing invaluable practical and theoretical experience. These professionals are not only committed to academic excellence, but also provide graduates with a practical perspective, ensuring quality training that prepares professionals to excel in this dynamic field.

A faculty composed of the most qualified experts in the field of Radiophysics will accompany you in this program"

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, Catholic University San Antonio of 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. 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 at the University of Valencia
- Reviewer of the journal Applied Radiation and Isotopes
- International PhD in Medical Physics, University of Seville, Spain
- Professional Master's Degree in Medical Physics from the University of Rennes I
- Degree in Physics from the University of Zaragoza
- Member of: European Federation of Organizations 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

This syllabus offers a solid training for engineering professionals interested in the field of Radiobiology. Throughout the syllabus, graduates will be immersed in the in-depth study of the different statistical models that underpin Radiobiology. This specialized approach will enable them to understand and precisely apply the mathematical principles that govern the interactions between radiation and biological systems. With a practical and applied approach, the program will prepare graduates to address technical and scientific challenges in the fascinating field of Radiophysics in Radiobiology.

Bet on TECH! You will delve into the interaction of Radiation with organic tissues through a 100% online methodology"

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 the Cell
- 1.1.3. Physicochemical 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. Radiation Effects 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 Radiation 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

Don't miss the opportunity to boost your career through TECH's disruptive Relearning system. Take advantage of this opportunity and 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.

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"

Case Study to contextualize all content

Our program offers a revolutionary approach to developing skills and knowledge. Our goal is to strengthen skills in a changing, competitive, and highly demanding environment.

At TECH, you will experience a learning methodology that is shaking the foundations of traditional universities around the world"

You will have access to a learning system based on repetition, with natural and progressive teaching throughout the entire syllabus.

The student will learn to solve complex situations in real business environments through collaborative activities and real cases.

A learning method that is different and innovative

This TECH program is an intensive educational program, created from scratch, which presents the most demanding challenges and decisions in this field, both nationally and internationally. This methodology promotes personal and professional growth, representing a significant step towards success. The case method, a technique that lays the foundation for this content, ensures that the most current economic, social and professional reality is taken into account.

> *Our program prepares you to face new challenges in uncertain environments and achieve success in your career"*

The case method is the most widely used learning system in the best faculties in the world. The case method was developed in 1912 so that law students would not only learn the law based on theoretical content. It consisted of presenting students with real-life, complex situations for them to make informed decisions and value judgments on how to resolve them. In 1924, Harvard adopted it as a standard teaching method.

What should a professional do in a given situation? This is the question that you are presented with in the case method, an action-oriented learning method. Throughout the program, the studies will be presented with multiple real cases. They will have to combine all their knowledge and research, and argue and defend their ideas and decisions.

Relearning Methodology

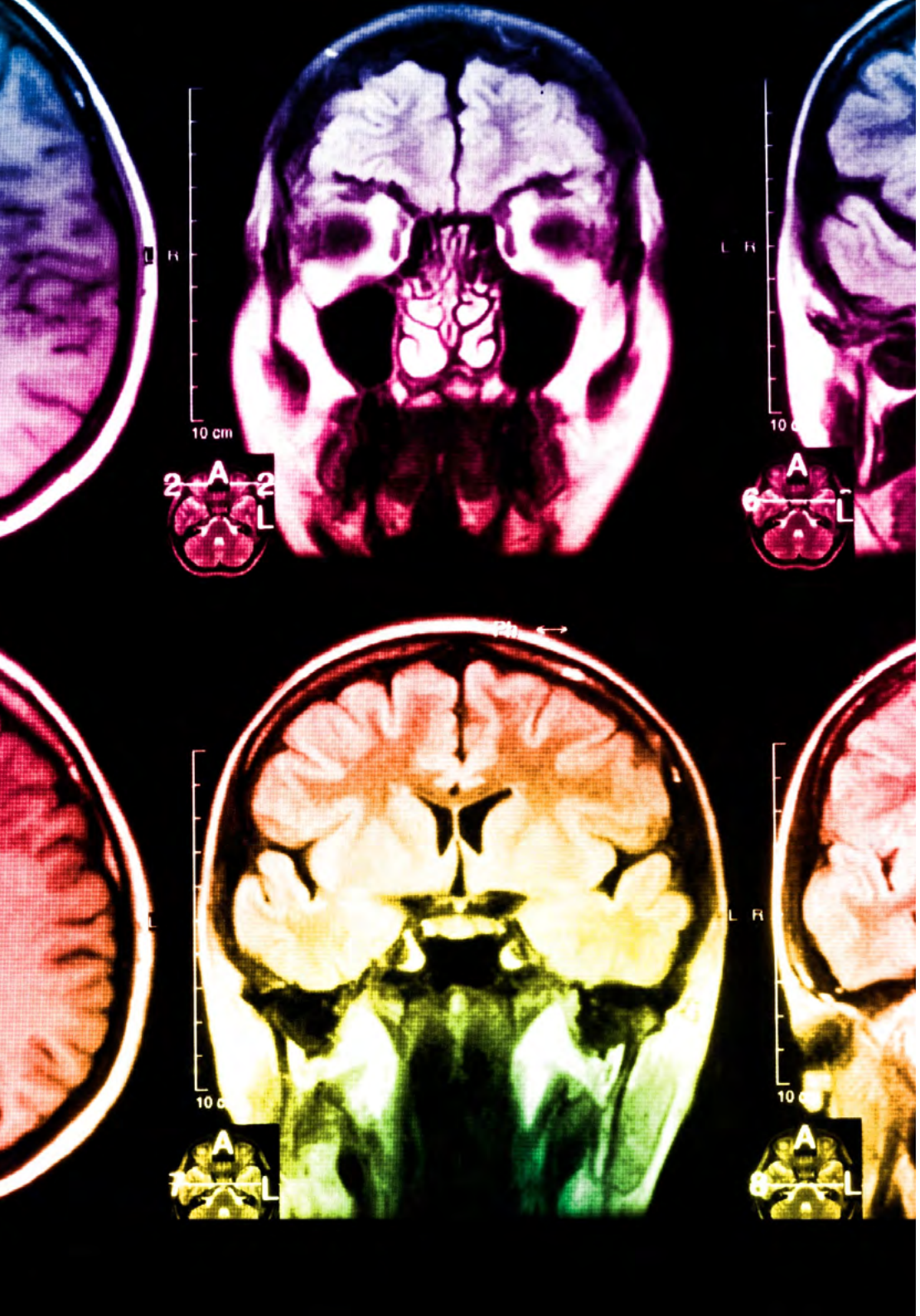
TECH effectively combines the Case Study methodology with a 100% online learning system based on repetition, which combines 8 different teaching elements in each lesson.

We enhance the Case Study with the best 100% online teaching method: Relearning.

In 2019, we obtained the best learning results of all online universities in the world.

At TECH, you will learn using a cutting-edge methodology designed to train the executives of the future. This method, at the forefront of international teaching, is called Relearning.

Our university is the only one in the world authorized to employ this successful method. In 2019, we managed to improve our students' overall satisfaction levels (teaching quality, quality of materials, course structure, objectives...) based on the best online university indicators.



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. This methodology has trained more than 650,000 university graduates with unprecedented success in fields as diverse as biochemistry, genetics, surgery, international law, management skills, sports science, philosophy, law, engineering, journalism, history, and financial markets and instruments. All this in a highly demanding environment, where the students have a strong socio-economic profile and an average age of 43.5 years.

Relearning will allow you to learn with less effort and better performance, involving you more in your training, developing a critical mindset, defending arguments, and contrasting opinions: a direct equation for success.

From the latest scientific evidence in the field of neuroscience, not only do we know how to organize information, ideas, images and memories, but we know that the place and context where we have learned something is fundamental for us to be able to remember it and store it in the hippocampus, to retain it in our long-term memory.

In this way, and in what is called neurocognitive context-dependent e-learning, the different elements in our program are connected to the context where the individual carries out their professional activity.

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.

Classes

There is scientific evidence suggesting that observing third-party experts can be useful.

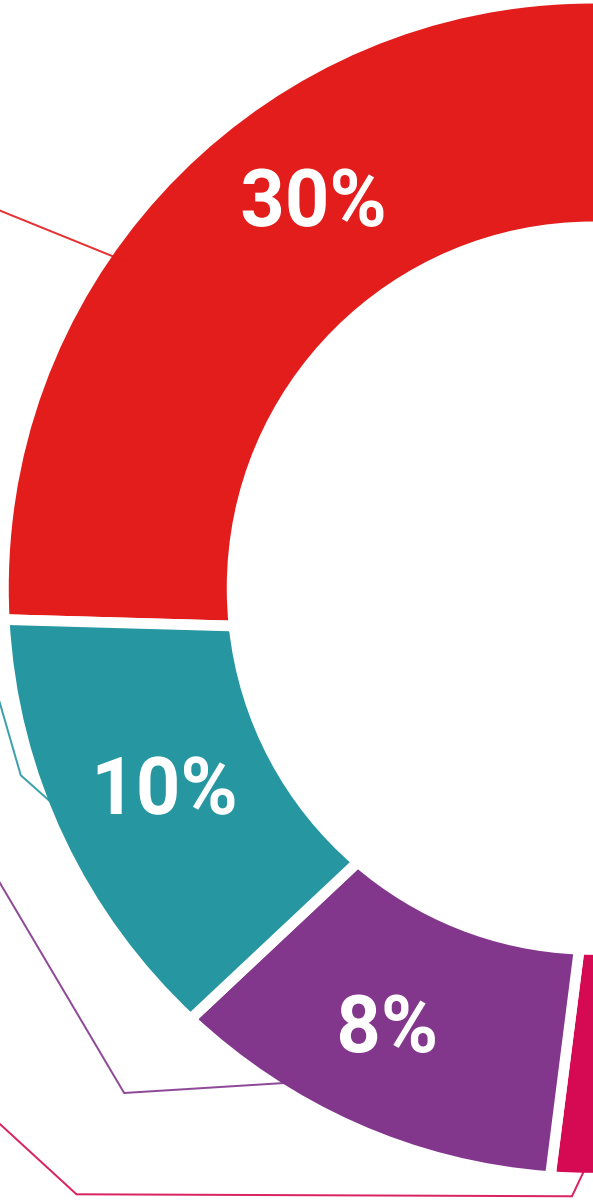
Learning from an Expert strengthens knowledge and memory, and generates confidence in future difficult decisions.

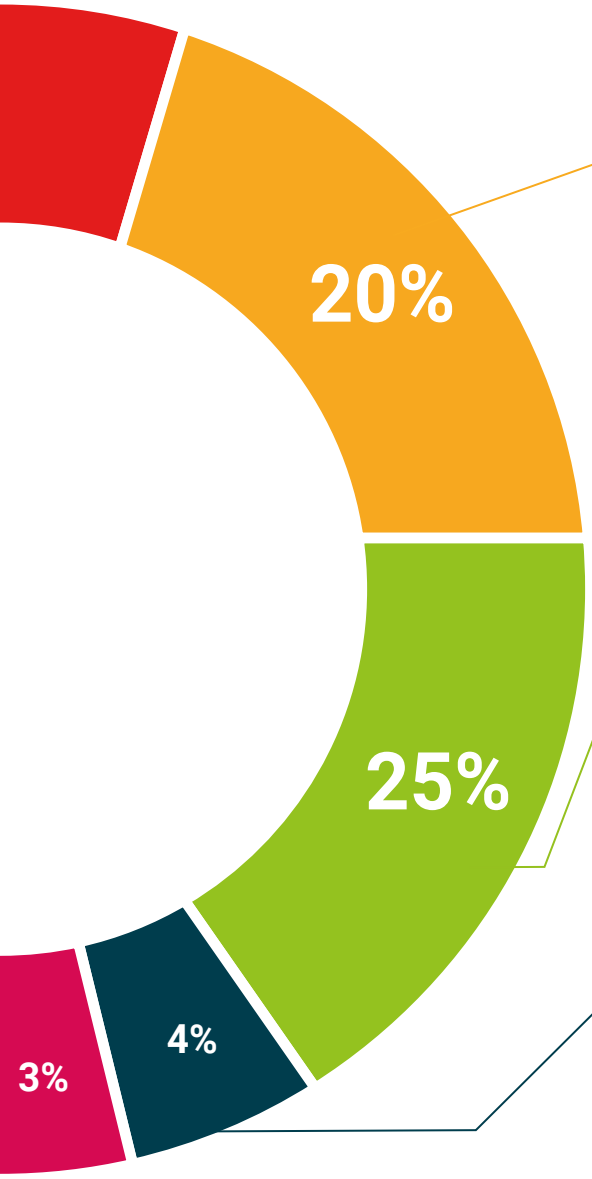
Practising Skills and Abilities

They will carry out activities to develop specific skills and abilities in each subject area. Exercises and activities to acquire and develop the skills and abilities that a specialist needs to develop in the context of the globalization that we are experiencing.

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.





Case Studies

Students will complete a selection of the best case studies chosen specifically for this program. Cases that are presented, analyzed, and supervised by the best specialists in the world.

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".

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.

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 Technological University.

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

This **Postgraduate Certificate in Radiophysics in Radiobiology** contains the most complete and up-to-date program 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 Radiobiology**

Official Nº of Hours: **150 h.**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Awards the following

CERTIFICATE

to

Mr./Ms. _____, with identification number _____.

For having passed and accredited the following program

POSTGRADUATE CERTIFICATE

in

Radiophysics in Radiobiology

This is a qualification awarded by this University, equivalent to 150 hours, with a start date of dd/mm/yyyy and an end date of dd/mm/yyyy.

TECH is a Private Institution of Higher Education recognized by the Ministry of Public Education as of June 28, 2018.

June 17, 2020

Tere Guevara Navarro

Dean

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 certificate issued with an apostille, TECH EDUCATION will make the necessary arrangements to obtain it, at an additional cost.

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