Postgraduate Certificate

Radiophysics in External Radiotherapy in Clinical Dosimetry

tech technological university

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Postgraduate Certificate
Radiophysics in External Radiotherapy in Clinical Dosimetry

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

Website: **www.techtitute.com/us/engineering/postgraduate-certificate/radiophysics-external-radiotherapy-clinical-dosimetry**

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01

Introduction

Faced with the particular challenges related to the implementation and operation of external radiotherapy systems, there is a need to acquire specialized knowledge essential to excel in the field of Medical Engineering. In this context, there is a growing demand for specialization in Radiophysics in External Radiotherapy in Clinical Dosimetry, highlighting the need for more specific and advanced training for engineers. This program, designed exclusively for engineering professionals, directly addresses this demand, providing an advanced specialization, which not only responds to the practical needs of the field, but also offers flexibility through a 100% online methodology and the application of the *Relearning* method for effective and lasting learning.

You will approach the manual calculation in Monitor Units, guaranteeing the proper radication reception, thanks to this innovative didactic program of TECH"

In the current context of Medical Engineering, Clinical Dosimetry and External Radiotherapy play a fundamental role in oncological treatment. In fact, the increasing complexity of procedures and the constant evolution of technology demand from engineers a deep understanding of the specific challenges they face in the design, implementation and operation of External Radiation Therapy systems. The practical relevance of this program stands out by addressing these challenges in a comprehensive manner, focusing on both theoretical and practical aspects.

In this context, the need arises for specialized training that not only responds to the demands of the field, but also provides engineers with the necessary tools to overcome the practical challenges they face on a daily basis. The specific agenda for this Postgraduate Certificate in Radiophysics in External Radiotherapy in Clinical Dosimetry will address crucial areas of Clinical Dosimetry and External Radiotherapy.

In this way, engineers will further their understanding of the different characteristics of the various External Radiotherapy treatments. This approach will enable graduates to acquire a comprehensive and detailed vision of treatment modalities, which is essential to ensure an accurate and personalized design of therapeutic plans. They will also analyze the verification systems of External Radiotherapy plans and the associated metrics, preparing them to ensure efficacy and quality in the practical application of these treatments.

The methodology of the academic itinerary reflects an essential adaptability for practicing professionals. The 100% online modality will provide the necessary flexibility, allowing engineers to advance in their training without compromising their job responsibilities. In addition, the implementation of the *Relearning*methodology, based on the repetition of key concepts, will not only facilitate the initial assimilation of knowledge, but will also promote long-term retention, allowing students to effectively apply what they have learned in their daily practice.

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

- The development of case studies presented by experts in Radiophysics in External Radiotherapy Clinical Dosimetry
- The graphic, schematic and practical contents with which it is conceived provide cutting- Therapeutics 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

As a radiophysics specialist, you will optimize sensor performance and the quality of medical images. Enroll now!"

With this innovative university program, TECH offers you a unique, key and decisive training experience to boost your professional development"

You will master the tools to evaluate an External Radiotherapy planning in the best digital university in the world, according to Forbes.

Enroll and you will access a 100% online course with Relearning methodology for a flexible and effective learning experience.

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.

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Objectives

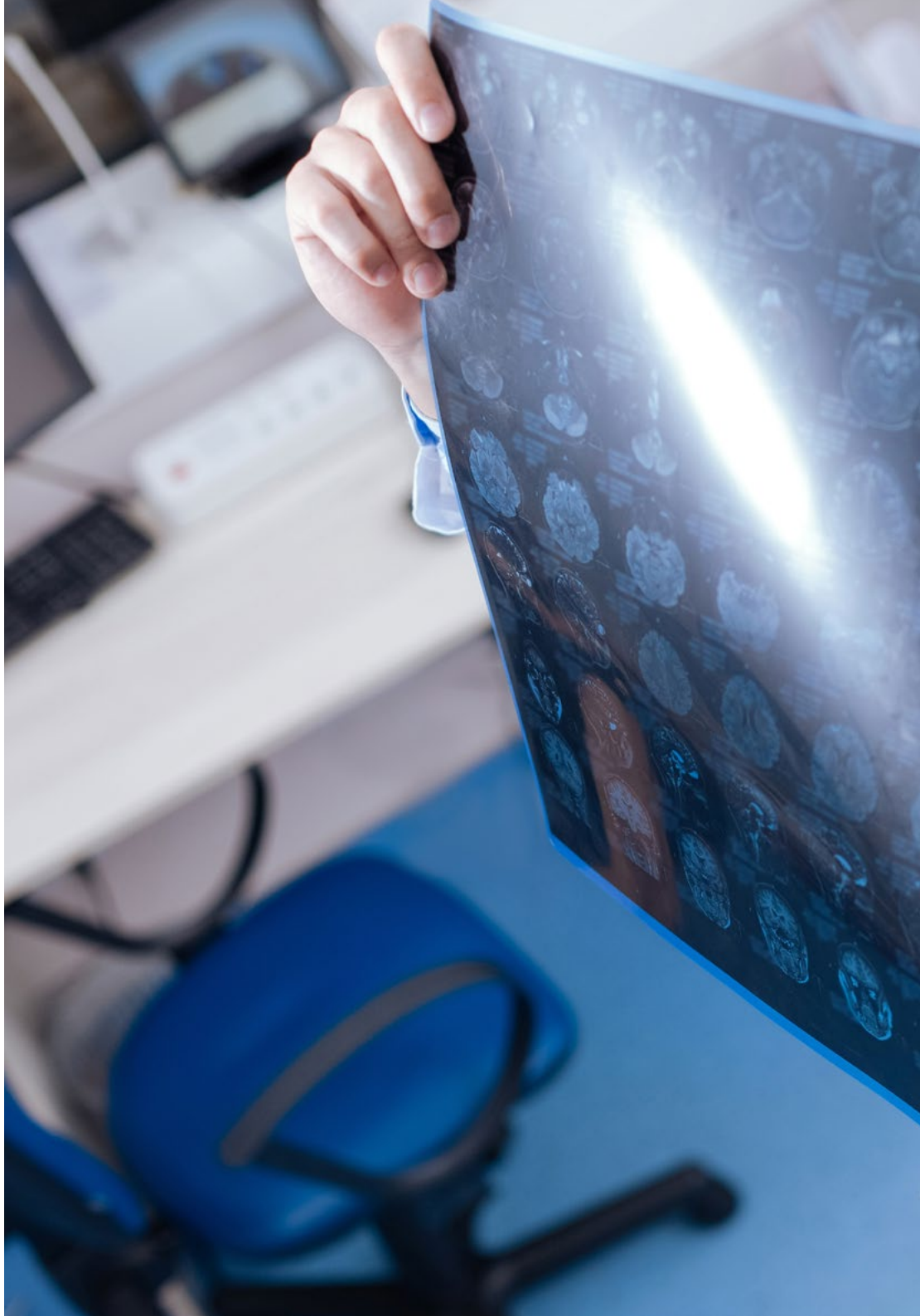
The program in Radiophysics in External Radiotherapy in Clinical Dosimetry has as its primary objective that graduates acquire a comprehensive mastery of the various characteristics of the different types of External Radiation Therapy treatments. Designed specifically for engineering professionals, this program will focus on providing the skills and knowledge necessary to understand and effectively manage the different therapeutic approaches used in External Radiation Therapy. In this way, specialists will be trained to evaluate and adapt treatment strategies according to the specific characteristics of each patient, standing out as experts in the field of Medical Engineering.

You will reach your goals thanks to TECH's didactic tools, among which the explanatory videos and interactive summaries stand out"

General Objectives

- 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

You will achieve your objectives without rigid schedules and evaluation timetables. That's what this TECH program is like!"



Specific Objectives

- Specify the different characteristics of the different types of external radiotherapy treatments
- Develop quality control procedures for planning systems
- Examine the tools used to evaluate external radiotherapy planning
- Analyze the different verification systems for external radiotherapy plans, as well as the metrics used

03

Course Management

When it comes to the formation of the teaching staff of this Postgraduate Certificate, TECH, in its commitment to educational excellence, has chosen the best professionals in the field. Each member of this faculty has been carefully selected for their extensive and recognized professional background in the field of Clinical Dosimetry. Composed of the best specialists, these professionals not only have a deep theoretical understanding, but also a vast practical experience in the verification of External Radiation Therapy plans.

Get updated in innovative treatment planning systems in External Radiotherapy by the hand of the best experts. Launch your career with TECH!"

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. Morera Cano, Daniel

- Specialist in Hospital Radiophysics
- Physician in Hospital Radiophysics at the University Hospital Son Espases
- Professional Master's Degree in Industrial Safety and Environment by the Polytechnic University of Valencia
- Professional Master's Degree in Radiological Protection in Radioactive and Nuclear Facilities by the Polytechnic University of Valencia
- Degree in Industrial Engineering from the Polytechnic University of Valencia

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Structure and Content

This academic program will provide specialized training for engineers, focusing on the verification of External Radiotherapy plans. Throughout the syllabus, graduates will delve into the various verification systems and metrics used, addressing in detail the practical and theoretical aspects necessary to ensure accuracy and efficiency in clinical procedures. Designed specifically for engineering professionals, this syllabus will provide crucial tools to meet the specific challenges of Clinical Dosimetry, excelling in the field of Medical Engineering.

In just 6 weeks you will delve into the different 3D conformal radiotherapy treatment techniques"

Module 1. External Radiotherapy. Clinical Dosimetry

1.1. Clinical Dosimetry in External Radiotherapy
- 1.1.1. Clinical Dosimetry in External Radiotherapy
- 1.1.2. Treatments in External Radiatherapy
- 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. Modeling in Planning Systems
- 1.3.2. Calculation Algorithms
- 1.3.3. Utilities of Planning Systems
- 1.3.4. Image Tools of the 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. Factors Intervening in the Dose Distribution
- 1.5.3. Practical Example of Calculation of UMs

1.6. Conformal 3D Radiotherapy Treatments
- 1.6.1. 3D Radiotherapy (RT3D)
- 1.6.2. RT3D Treatments with Photon Beams
- 1.6.3. RT3D Treatments with Electron Beams

1.7. Advanced Intensity Modulated Treatments
- 1.7.1. Intensity Modulated Treatments
- 1.7.2. Optimization
- 1.7.3. Specific Quality Control

1.8. Evaluation of an External Radiotherapy Planning
- 1.8.1. Dose-Volume Histogram
- 1.8.2. Conformation Index and Homogeneity Index
- 1.8.3. Clinical Impact of the Schedules
- 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 Radiation Therapy

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

No rigid schedules or evaluation timelines: that's what this TECH program is all about"

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

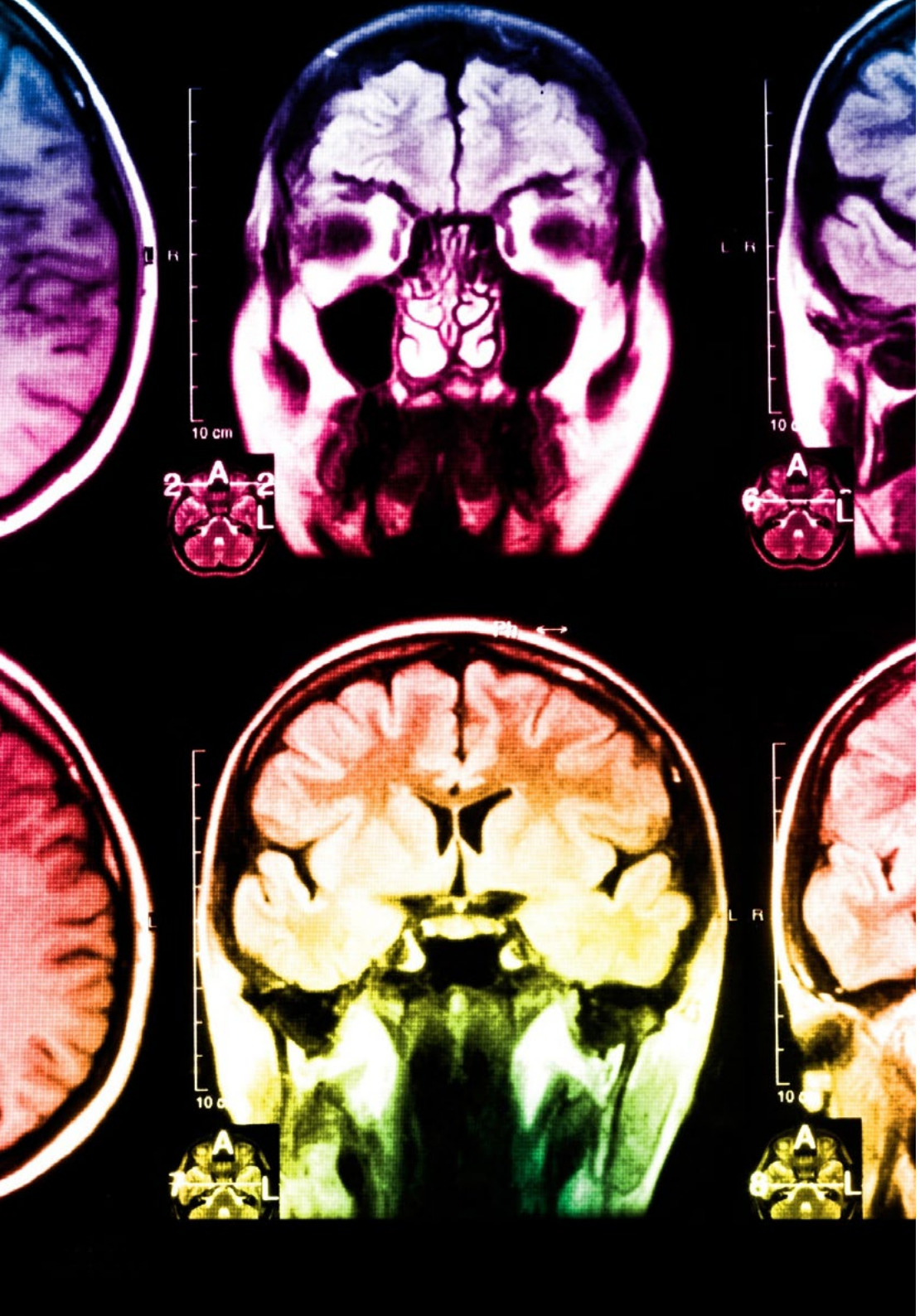
TECH effectively combines the Case Study methodology with a 100% online learning system based on repetition, which combines 8 different teaching elements in each lesson.

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.

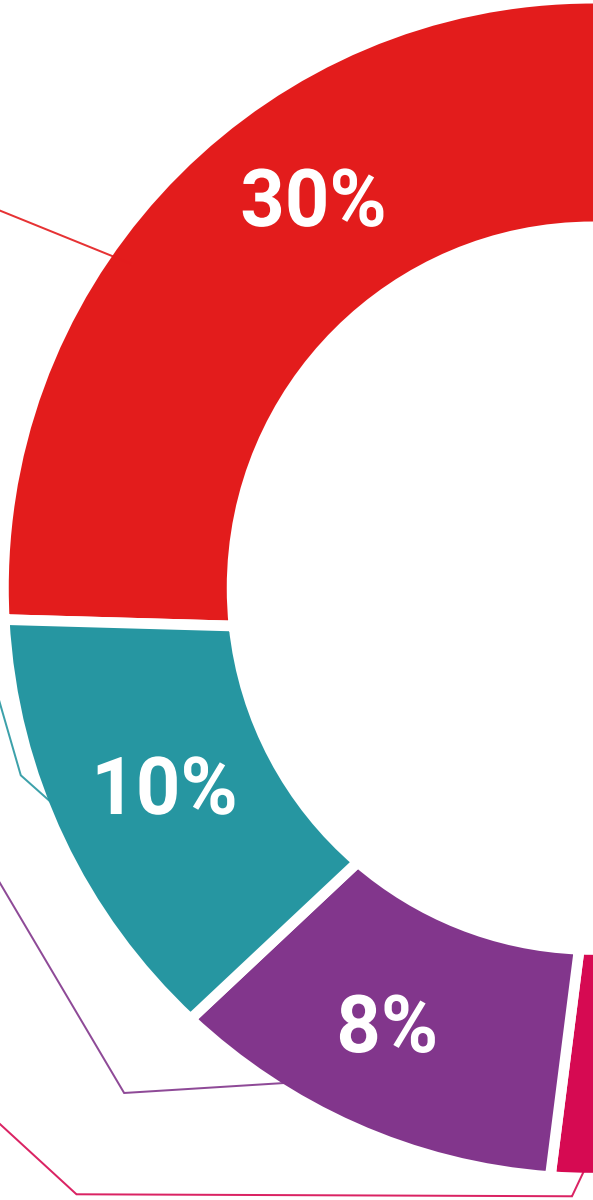
Learning from an Expert strengthens knowledge and memory, and generates confidence in future difficult decisions.

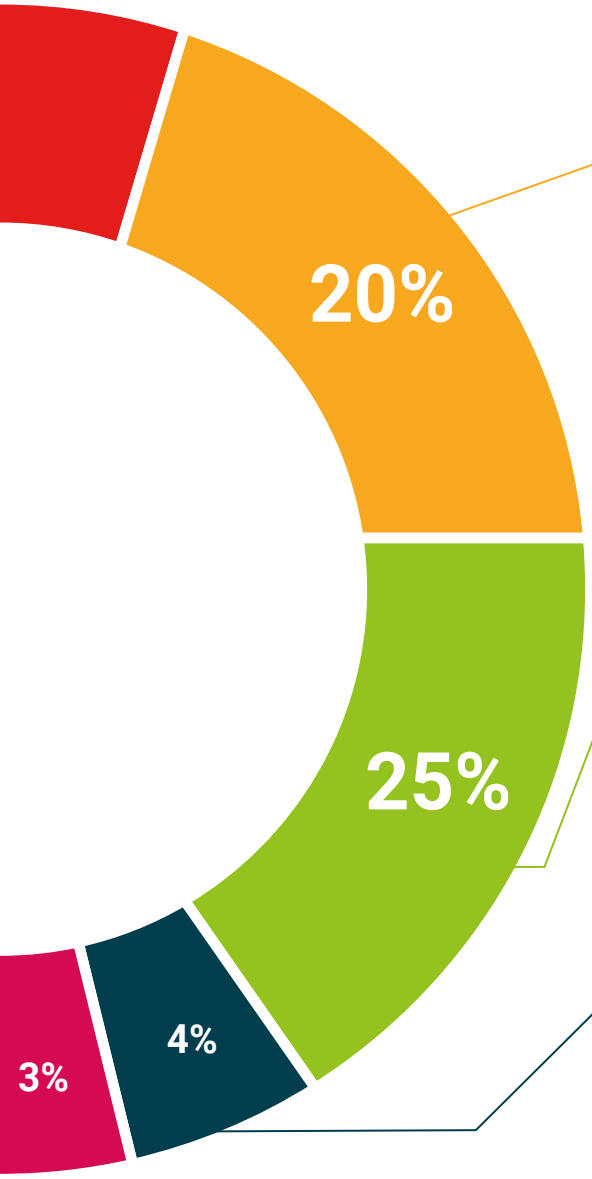
Practising Skills and Abilities

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 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 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 External Radiotherapy in Clinical Dosimetry** 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 diploma 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 External Radiotherapy in Clinical Dosimetry**

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

DIPLOMA

to

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

For having passed and accredited the following program

POSTGRADUATE CERTIFICATE

in

Radiophysics in External Radiotherapy in Clinical Dosimetry

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

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