Postgraduate Diploma

Diagnostic Engineering and Clinical Follow-Up

tech technological university

tech technological university

Postgraduate Diploma

Diagnostic Engineering and Clinical Follow-Up

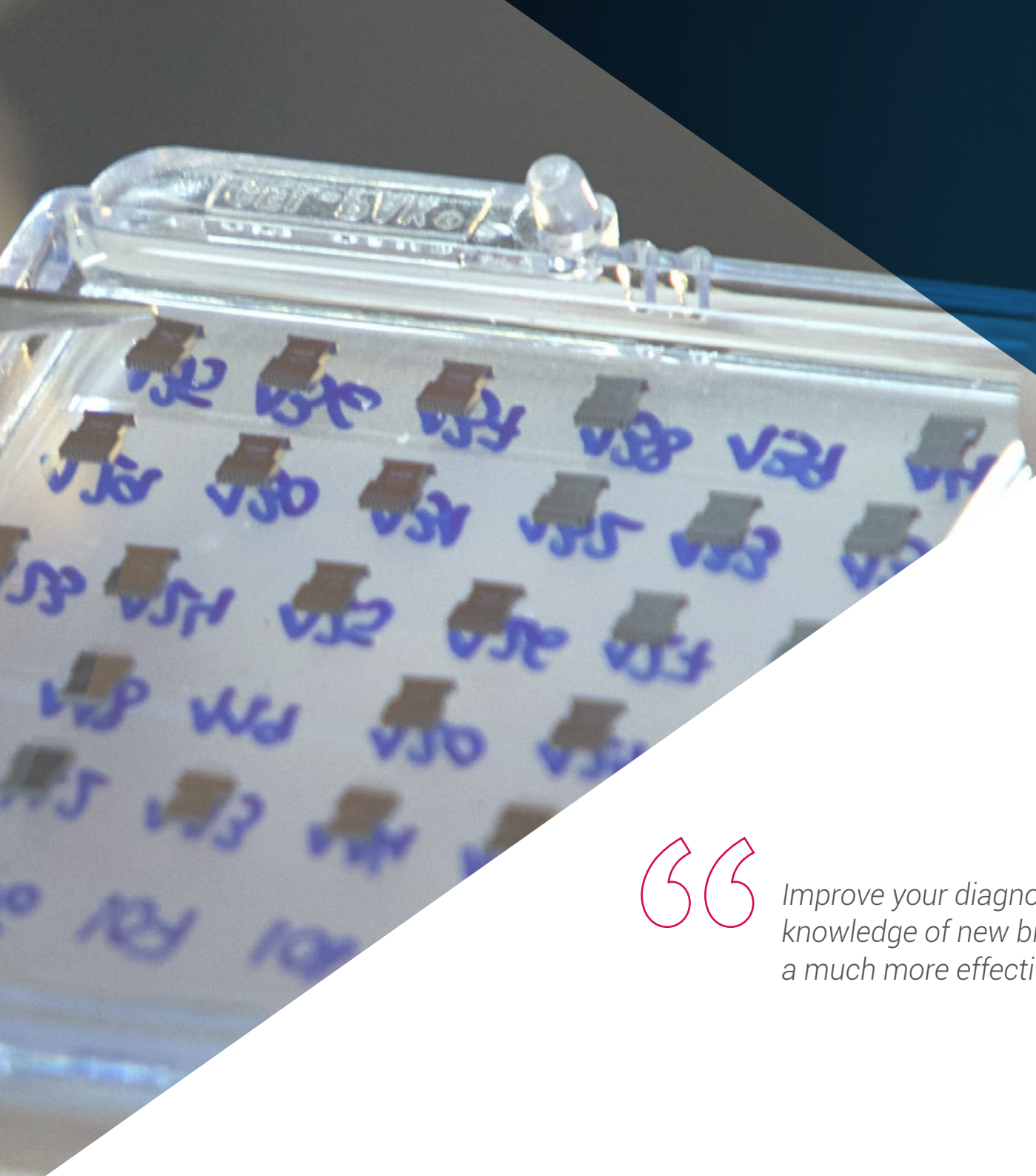
Course Modality: **Online**
Duration: **6 months.**
Certificate: **TECH Technological University**
18 ECTS Credits
Teaching Hours: **450 hours**
Website: **www.techtitute.com/us/medicine/postgraduate-diploma/postgraduate-diploma-diagnostic-engineering-clinical-follow-up**

Index

01

Introduction

Clinical diagnostics is increasingly benefiting from the incorporation of new technological tools. In this regard, the latest findings in the field of biomedical engineering have enabled the physician to achieve a much more effective diagnosis with less risk and time. For this reason, and taking into account that biomedicine is a sector that is constantly growing, this university presents this program in which these techniques are studied in depth, delving into issues such as computed tomography or Doppler ultrasound, as well as the generation of biomodels from the image, among other issues. All this, through an online and flexible teaching system that adapts to the circumstances of the professional so that they can combine their studies with other day-to-day tasks.



Improve your diagnostic capacity by deepening your knowledge of new biomedical techniques You will become a much more effective and prepared professional"

Biomedicine is revolutionizing clinical processes. Now, it is much simpler and more efficient to perform diagnostics by means of state-of-the-art proprietary tests. For this reason, it is crucial for physicians to keep abreast of these advances, as this is the only way to provide an efficient response to complex patients and pathologies. In this sense, this program is unique because it offers the specialist a fully updated and complete knowledge in this field, preparing them to use high-level tests in the elaboration of their clinical diagnoses.

During the course of the program, the physician will delve into aspects such as Nuclear Medicine, ultrasound medical imaging, image processing, image-guided surgery, robotic vision, *deep learning* and *machine learning* applied to medical imaging, applications of medical hardware and software or biosensors, among many other aspects. Thanks to all this, you will acquire a much more complete vision of the field of biomedicine, being able to improve exponentially in your daily clinical practice.

And all this thanks to TECH's 100% online learning system, which will allow doctors to combine their studies with their professional career. In addition, you will benefit from numerous multimedia teaching resources such as procedural videos, interactive summaries, case studies or master classes, always supervised by a teaching staff specialized in this field of medicine.

The **Postgraduate Diploma in Diagnostic Engineering and Clinical Follow-Up** contains the scientific most complete and up-to-date educational program on the market. The most important features include:

- Practical cases presented by experts in Biomedicine
- The graphic, schematic, and eminently practical contents with which they are created, 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

The future of medicine involves the incorporation of new technologies for the diagnosis and follow-up of numerous patients Don't get left behind and specialize with this 100% online program"

Study from the experience of an expert teaching staff and get up to date to incorporate the latest advances in diagnostic biomedicine into your daily practice"

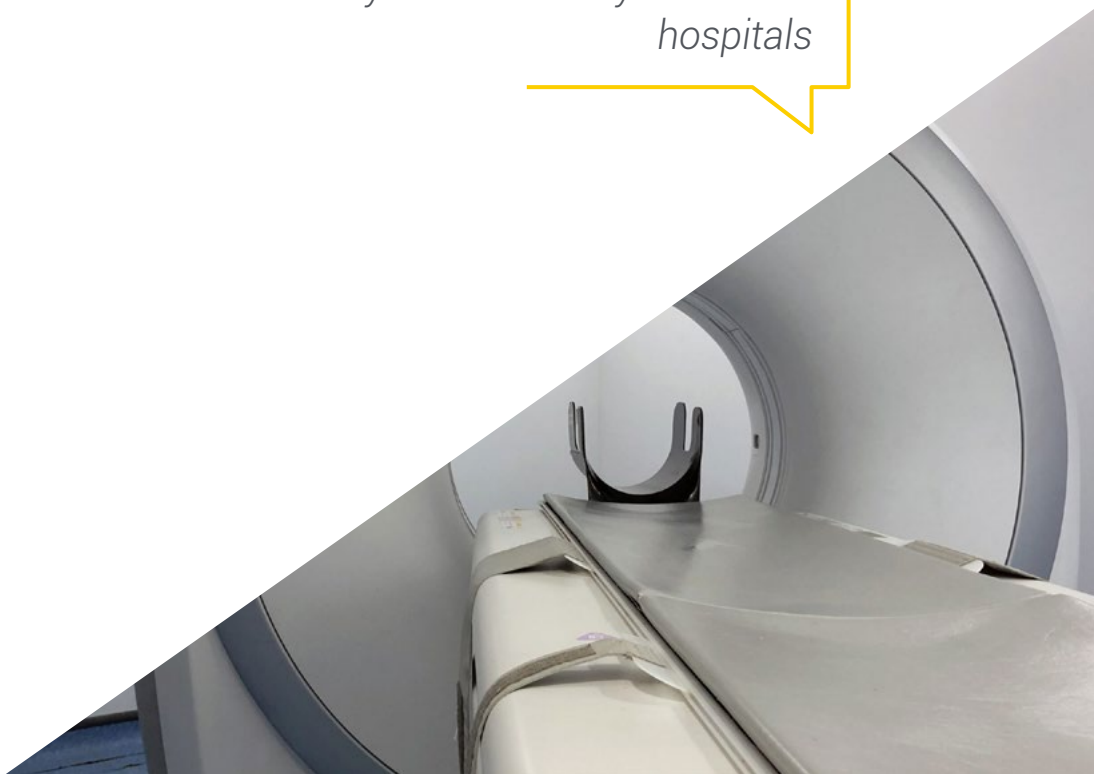
You will study with the most innovative contents of the current academic landscape, and with the most effective pedagogical resources when it comes to consolidate learning

Delve into nanotechnology and medical devices and become a specialist in demand by internationally renowned hospitals

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 training programmed to train 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 student will be assisted by an innovative interactive video system created by renowned and experienced experts.



02

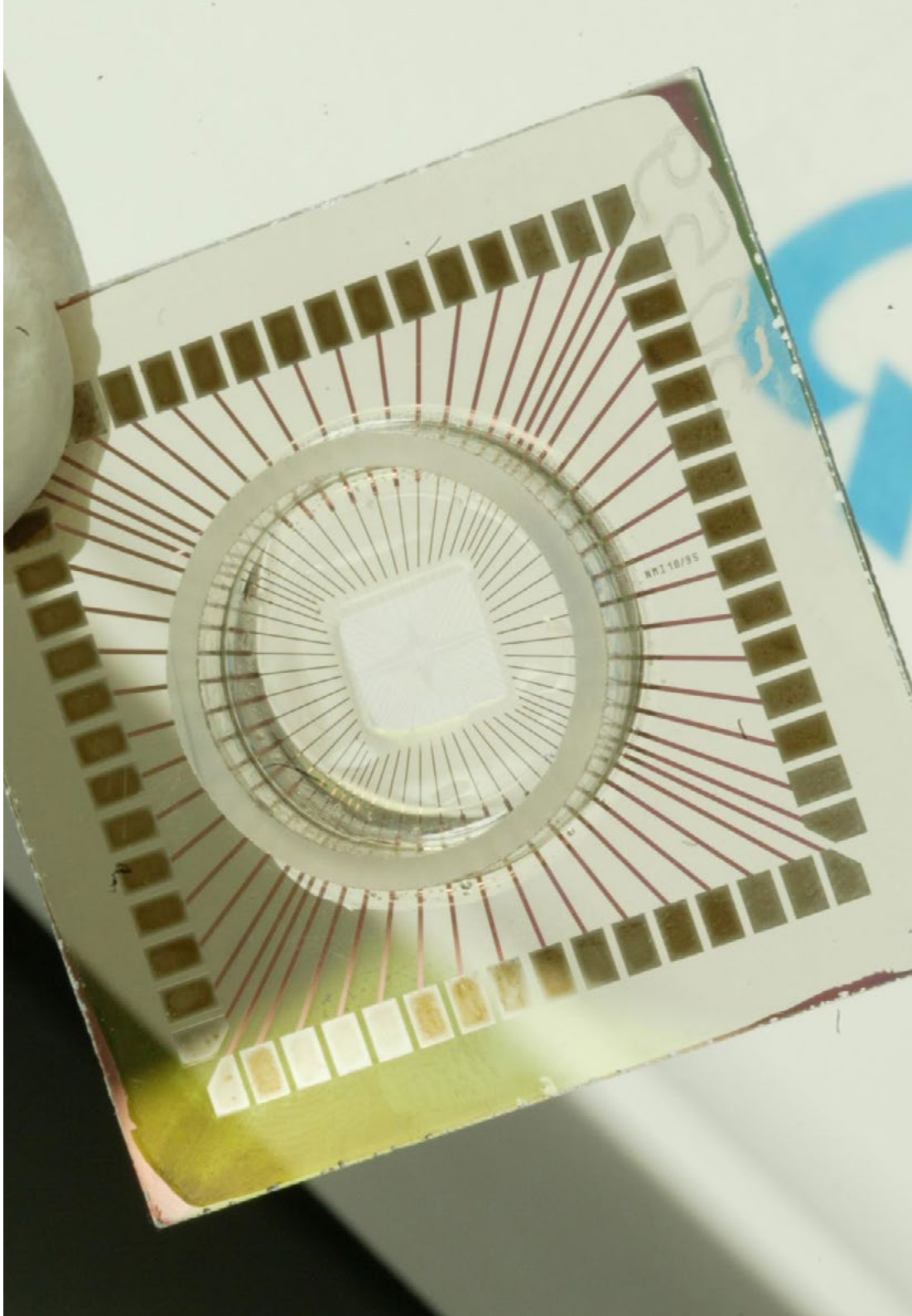
Objectives

Being fully aware that Biomedicine is the future of medical practice, TECH has designed this complete Postgraduate Diploma that aims to offer the specialist the most updated knowledge in the use of state-of-the-art technology for the diagnosis and monitoring of the patient. Therefore, this program is a great opportunity in the hands of the physician since they will be able to learn in a way that is 100% compatible with their professional activity, at their own pace and by means of highly effective pedagogical tools.

Complete, flexible and tailored to your needs: this Postgraduate Diploma is the option you were waiting for to update your knowledge in the field of Diagnostic Biomedicine"

General Objectives

- Generate specialized knowledge on the main types of biomedical signals and their uses
- Develop the physical and mathematical knowledge underlying biomedical signals
- Fundamentals of the principles governing signal analysis and processing systems
- Analyze the main applications, trends and lines of research and development in the field of biomedical signals
- Develop expertise in classical mechanics and fluid mechanics
- Analyze the general functioning of the motor system and its biological mechanisms
- Develop models and techniques for the design and prototyping of interfaces based on design methodologies and their evaluation
- Provide the student with critical skills and tools for interface assessment
- Explore the interfaces used in pioneering technology in the biomedical sector
- Analyze the fundamentals of medical imaging acquisition, inferring its social impact
- Develop specialized knowledge about the operation of the different imaging techniques, understanding the physics behind each modality
- Identify the usefulness of each method in relation to its characteristic clinical applications
- Investigate post-processing and management of acquired images
- Use and design biomedical information management systems
-
- Analyze current digital health applications and design biomedical applications in a hospital setting or clinical center



Specific Objectives

Module 1. Biomedical Images

- Develop specialized knowledge about medical imaging as well as the DICOM standard
- Analyze the radiological technique for medical imaging, clinical applications and aspects influencing the outcome
- Examine the technique of magnetic resonance imaging for medical imaging, clinical applications, and aspects influencing outcome
- Analyze the radiological technique for medical imaging, clinical applications and aspects influencing the outcome
- Evaluate the effect of noise on clinical images as well as different image processing methods
- Present and analyze image segmentation technologies and explain their usefulness
- Gain a deeper understanding of the direct relationship between surgical interventions and imaging techniques

Module 2. Biomedical Technologies: Biodevices and Biosensors

- Generate specialized knowledge in the conception, design, implementation operation of medical devices through the technologies used in this field
- Determine the main technologies for rapid prototyping
- Discover the main fields of application: Diagnostic, therapeutic and supportive
- Establish the different types of biosensors and their use for each diagnostic case
- Deepen the understanding of the physical/electrochemical functioning of the different types of biosensors
- Examine the importance of biosensors in modern medicine

Module 3. Digital Health Applications in Biomedical Engineering

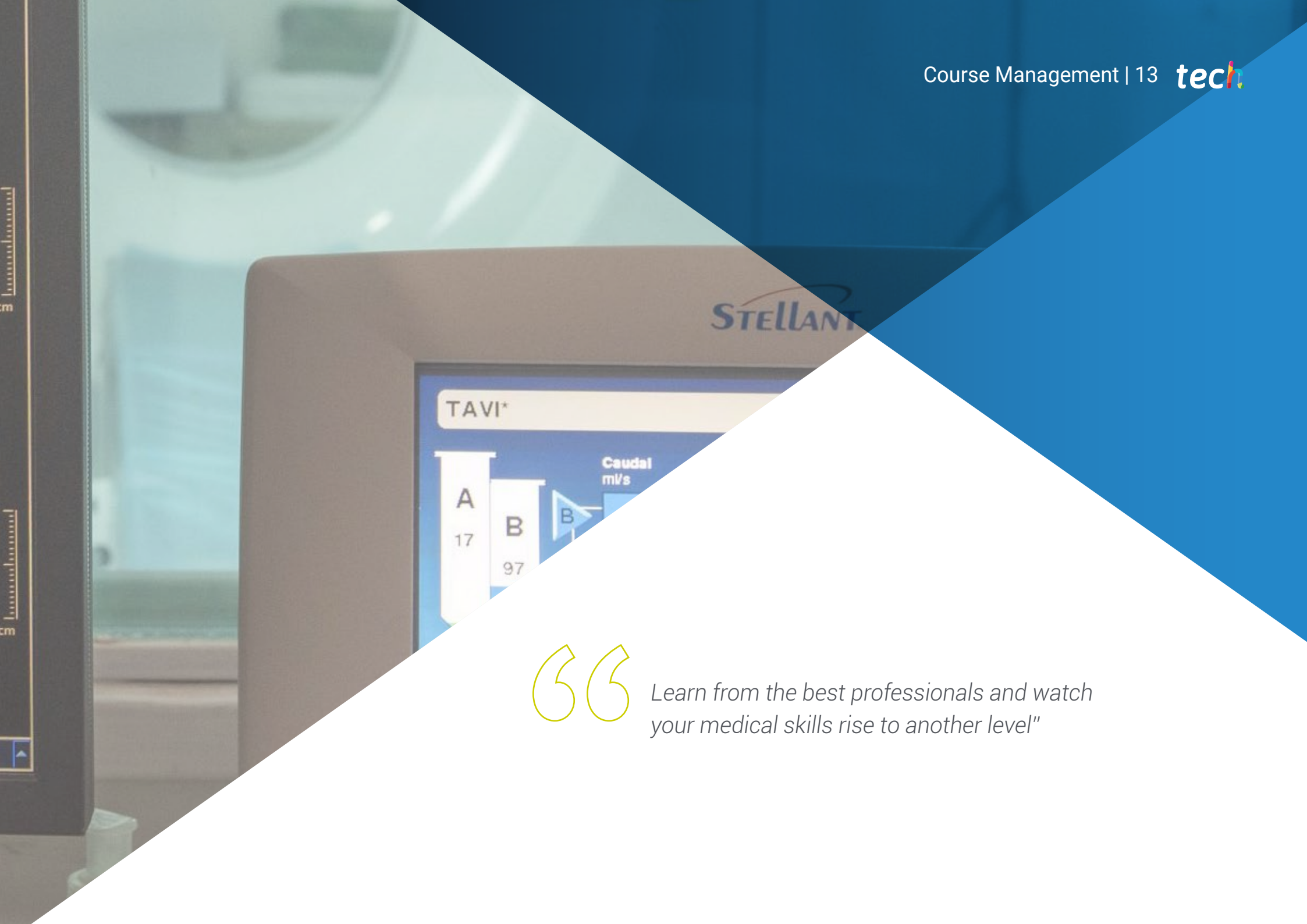
- Analyze the referential framework of digital health applications
- Examine medical image storage and transmission systems
- Evaluate relational database management for digital health applications
- Establish the operation of digital health applications based on web development
- Develop web applications in a hospital or clinical center environment and telemedicine applications
- Analyze applications with the Internet of Medical Things, IoMT and digital health applications with artificial intelligence techniques

This program will help you achieve your professional goals thanks to a wealth of online teaching resources specially designed to facilitate learning"

03

Course Management

By attending this program, the physician will have access to the teaching of an expert faculty that will put its years of professional, academic and research experience at the service of the student to provide the best learning experience. A great opportunity to learn from the best is only possible by studying at TECH, the world's largest digital university.



Learn from the best professionals and watch your medical skills rise to another level"

Management

Ruiz Díez, Carlos

- Researcher at the National Microelectronics Center of the CSIC.
- Researcher. Composting Research Group of the Department of Chemical, Biological and Environmental Engineering of the UAB.
- Founder and product development at NoTime Ecobrand, a fashion and recycling brand.
- Development cooperation project manager for the NGO Future Child Africa in Zimbabwe.
- Graduate in Industrial Technologies Engineering from Universidad Pontificia de Comillas ICAI.
- Master's Degree in Biological and Environmental Engineering from the Autonomous University of Barcelona.
- Master's Degree in Environmental Management from the Universidad Española a Distancia (Spanish Open University)

Professors

Dr. Vásquez Cevallos, Leonel

- Advisor in the preventive and corrective maintenance and sale of medical equipment and software. Received medical imaging equipment maintenance training, Seoul, South Korea. Telemedicine Cayapas Research Project Manager.. Knowledge transfer and management manager. Officegolden.
- PhD's Degree in Biomedical Engineering from the Polytechnic University of Madrid.
- Master's Degree in Telemedicine and of Bioengineering from the Polytechnic University of Madrid.
- Engineer / Graduate in Electronics and Telecommunications from the ESPOL University. Academic Training in Ecuador
- Teachers at Polytechnic University of Madrid.
- Teacher at Escuela Superior Politécnica del Litoral. Equator
- Lecturer at the University of Guayaquil.
- Lecturer at Technological University of Business in Guayaquil.

Ruiz Díez, Sara

- Member of the Neural Rehabilitation Group, Instituto Cajal del CSIC.
- Responsible for illustrations for Corto tratado de angiología y cirugía vascular, by Dr. Ruiz Grande.
- Degree in Biomedical Engineering from the Polytechnic University of Madrid.
- Specialty in Biomaterials, Biomechanics and Medical Devices.

Somolinos Simón, Francisco Javier

- Biomedical engineer and researcher at the Bioengineering and Telemedicine Group of the Polytechnic University of Madrid.
- Degree in Biomedical Engineering from the Polytechnic University of Madrid.
- Master's Degree in Management and Development of Biomedical Technologies by the Carlos III University of Madrid
- PhD in Biomedical Engineering

04

Structure and Content

This Postgraduate Diploma in Diagnostic Engineering and Clinical Monitoring is structured in 3 specialized modules, through which the physician will be able to learn about the latest advances in medical image storage and transmission systems, image generation and detection in Nuclear Medicine, image analysis and segmentation, image-guided surgery and the manufacture of biosensor prototypes, among others.

Engineering applied to diagnostics is key to the development of medicine In this program you will find the latest content on the subject so that you can get up to date in the best possible way"

Module 1. Biomedical Images

1.1. Biomedical Images
- 1.1.1. Medical Images
- 1.1.2. Objectives of Imaging Systems in Medicine
- 1.1.3. Types of Images

1.2. Radiology
- 1.2.1. Radiology
- 1.2.2. Conventional Radiology
- 1.2.3. Digital Radiology

1.3. Ultrasound
- 1.3.1. Medical Images With Ultrasound
- 1.3.2. Training and Image Quality
- 1.3.3. Doppler Ultrasound
- 1.3.4. Implementing and New Technologies

1.4. Computerized Tomography
- 1.4.1. CT Imaging Systems
- 1.4.2. Reconstruction and CT Image Quality
- 1.4.3. Clinical Applications

1.5. Magnetic Resonance
- 1.5.1. Magnetic Resonance Imaging (MRI)
- 1.5.2. Resonance and Nuclear Magnetic Resonance
- 1.5.3. Nuclear Relaxation
- 1.5.4. Tissue Contrast and Clinical Applications

1.6. Nuclear Medicine
- 1.6.1. Generation and Image Detection
- 1.6.2. Image Quality
- 1.6.3. Clinical Applications

1.7. Image Processing
- 1.7.1. Noise
- 1.7.2. Intensification
- 1.7.3. Histograms
- 1.7.4. Magnification
- 1.7.5. Processing

1.8. Analysis and Image Segmentation
- 1.8.1. Segmentation.
- 1.8.2. Segmentation by Region
- 1.8.3. Edge Detection Segmentation
- 1.8.4. Generation of Biomodels From Images

1.9. Image-Guided Interventions
- 1.9.1. Visualization Methods
- 1.9.2. Image-Guided Surgeries
  - 1.9.2.1. Planning and Simulation
  - 1.9.2.2. Surgical Visualization
  - 1.9.2.3. Virtual Reality
- 1.9.3. Robotic Vision

1.10. *Deep Learning* and *Machine Learning* in Medical Imaging
- 1.10.1. Types of Recognition
- 1.10.2. Supervised Techniques
- 1.10.3. Unsupervised Techniques

Module 2. Biomedical Technologies: Biodevices and Biosensors

2.1. Medical Devices
- 2.1.1. Product Development Methodology
- 2.1.2. Innovation and creativity
- 2.1.3. CAD Technologies

2.2. Nanotechnology
- 2.2.1. Medical Nanotechnology
- 2.2.2. Nanostructured Materials
- 2.2.3. Nano-Biomedical Engineering

2.3. Micro and Nanofabrication
- 2.3.1. Design of Micro and Nano Products
- 2.3.2. Techniques
- 2.3.3. Tools for Manufacturing

2.4. Prototypes
- 2.4.1. Additive Manufacturing
- 2.4.2. Rapid Prototyping

2.4.3. Classification
2.4.4. Applications
2.4.5. Study Cases
2.4.6. Conclusions
2.5. Diagnostic and Surgical Devices
2.5.1. Development of Diagnostic Methods
2.5.2. Surgical Planning
2.5.3. Biomodels and Instruments Made With 3D Printing
2.5.4. Device-Assisted Surgery
2.6. Biomechanic Devices
2.6.1. Prosthetists
2.6.2. Intelligent Materials
2.6.3. Orthotics
2.7. Biosensors
2.7.1. Biosensor
2.7.2. Sensing and Transduction
2.7.3. Medical Instrumentation for Biosensors
2.8. Typology of Biosensors (I): Optic Sensors
2.8.1. Reflectometry
2.8.2. Interferometry and Polarimetry
2.8.3. Evanescent Field
2.8.4. Fiber Optic Probes and Guides
2.9. Typology of Biosensors (II): Physical, Electrochemical and Acoustic Sensors
2.9.1. Physical Sensors
2.9.2. Electrochemical Sensors
2.9.3. Acoustic Sensors
2.10. Integrated Systems
2.10.1. *Lab-On-A-Chip*
2.10.2. Microfluidics
2.10.3. Medical Application

Module 3. Digital Health Applications in Biomedical Engineering

3.1. Digital Health Applications
3.1.1. Medical Hardware and Software Applications
3.1.2. Software Applications: Digital Health Systems
3.1.3. Usability of Digital Health Systems
3.2. Medical Image Storage and Transmission Systems
3.2.1. Image Transmission Protocol: DICOM
3.2.2. Medical Image Storage and Transmission Server Installation: PAC System
3.3. Relational Database Management for Digital Health Applications
3.3.1. Relational Database, Concept and Examples
3.3.2. Database Language
3.3.3. Database With MySQL and PostgreSQL
3.3.4. Applications: Connection and Uses in Web Programming Language
3.4. Digital Health Applications Based on Web Development
3.4.1. Web Application Development
3.4.2. Web Development Model, Infrastructure, Programming Languages and Working Environments
3.4.3. Examples of Web Applications With the Languages: PHP, HTML, AJAX, CSS Javascript, AngularJS, NodeJS
3.4.4. Development of Applications in Web Frameworks: Symfony and Laravel
3.4.5. Development of Applications in Content Management Systems, CMS: Joomla and WordPress
3.5. WEB Applications in a Hospital Environment or Clinical Center
3.5.1. Applications for Patient Management: Reception, Scheduling and Collections
3.5.2. Applications for Medical Professionals Consultations or Medical Care, Medical History, Medical Reports, Medical Records
3.5.3. Web and Mobile Applications for Patients: Agenda Requests, Monitoring

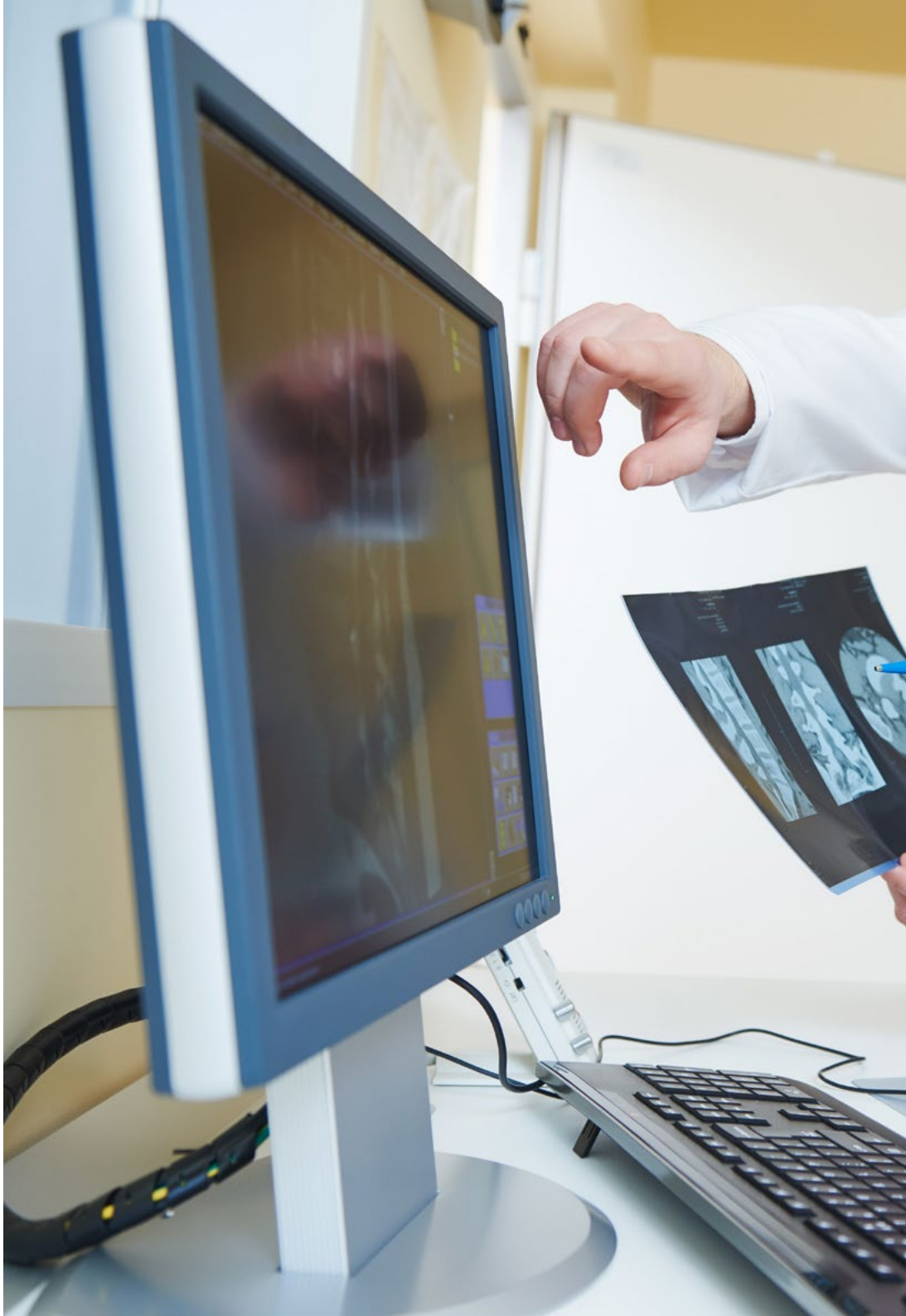
3.6. Telemedicine Applications
- 3.6.1. Service Architecture Models
- 3.6.2. Telemedicine Applications: Teleradiology, Teleradiology, Telecardiology and Teledermatology
- 3.6.3. Rural Telemedicine

3.7. Applications With the Internet of Medical Things, IoMT
- 3.7.1. Models and Architectures
- 3.7.2. Medical Data Acquisition Equipment and Protocols
- 3.7.3. Applications: Patient Monitoring

3.8. Digital Health Applications Using Artificial Intelligence Techniques
- 3.8.1. *Machine Learning*
- 3.8.2. Computing Platforms and Development Environments
- 3.8.3. Examples:

3.9. Digital Health Applications with *Big Data*
- 3.9.1. Digital Health Applications with *Big Data*
- 3.9.2. Technologies Used in *Big Data*
- 3.9.3. Use Cases of Big Data in Digital Health

3.10. Factors Associated With Sustainable Digital Health Applications and Future Trends
- 3.10.1. Legal and Regulatory Framework
- 3.10.2. Best Practices in the Development of Digital Health Application Projects
- 3.10.3. Future Trends in Digital Health Applications



You are facing a unique opportunity to become a more skilled physician through your abilities in the use of the latest technology in clinical diagnostics Don't miss this opportunity and get up to date"

05

Methodology

This training program provides you with a different way of learning. Our methodology uses a cyclical learning approach: ***Re-learning***.

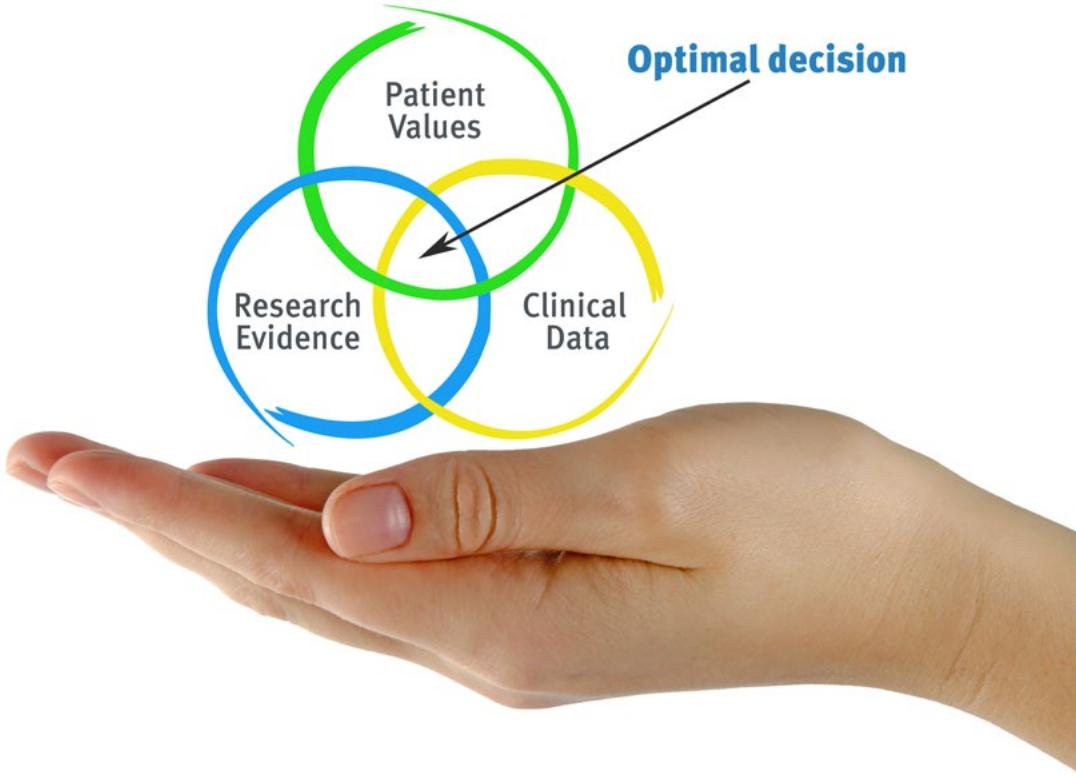
This teaching system is used, for example, in the most prestigious medical schools in the world, and major publications such as the ***New England Journal of Medicine have considered it to be one of the most effective.***

Discover Re-learning, 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 abundant 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:

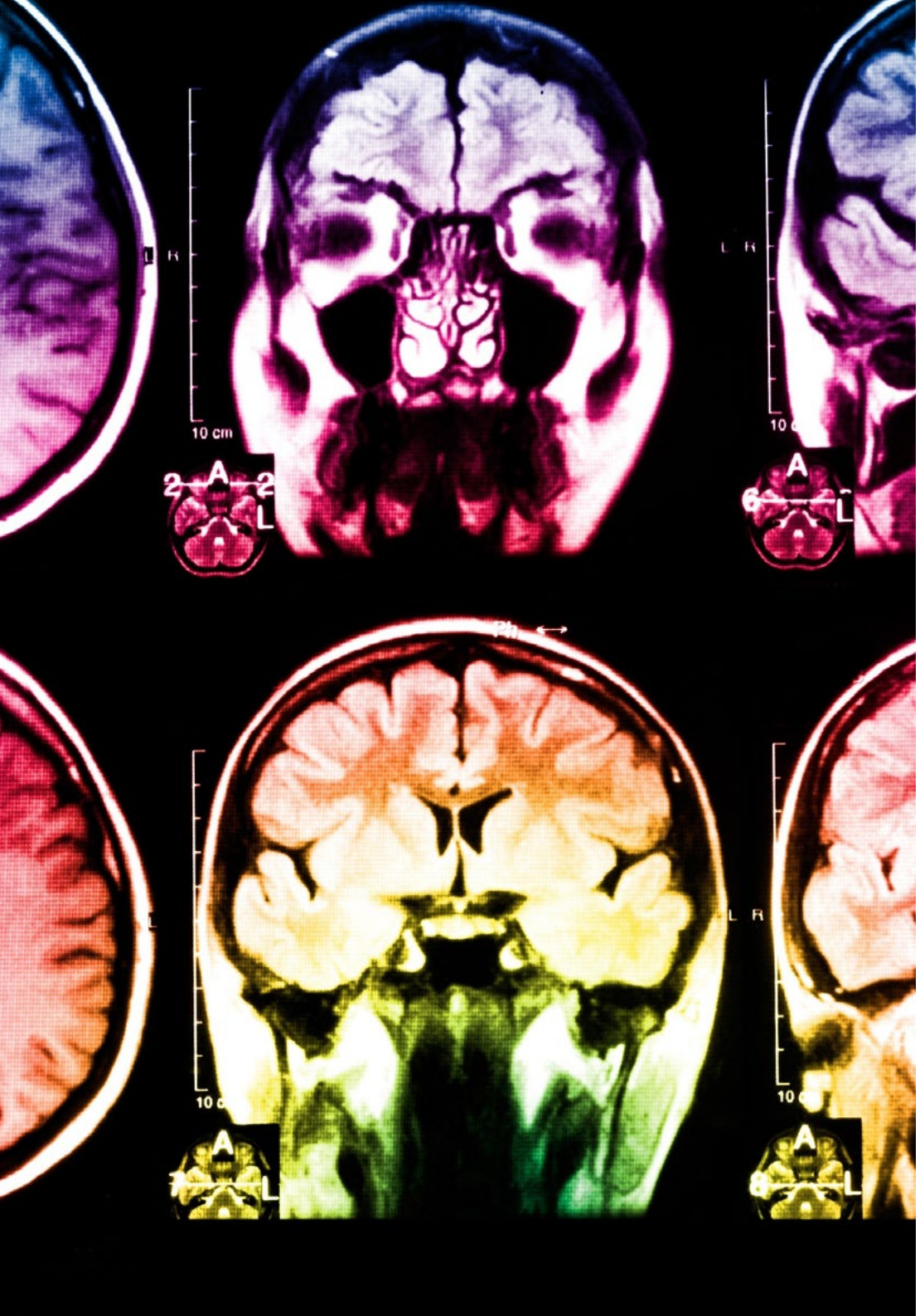
1. Students who follow this method not only achieve the assimilation of concepts, but also a development of their mental capacity, through exercises that evaluate real situations and the application of knowledge.
2. Learning is solidly translated into practical skills that allow the student to better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

Re-learning Methodology

At TECH we enhance the Harvard case method with the best 100% online teaching methodology available: Re-learning.

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 Re-learning method has managed to improve the overall satisfaction levels of professionals who complete their studies, with respect to the quality indicators of the best Spanish-speaking 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 high socioeconomic profile and an average age of 43.5 years old.

Re-learning 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.

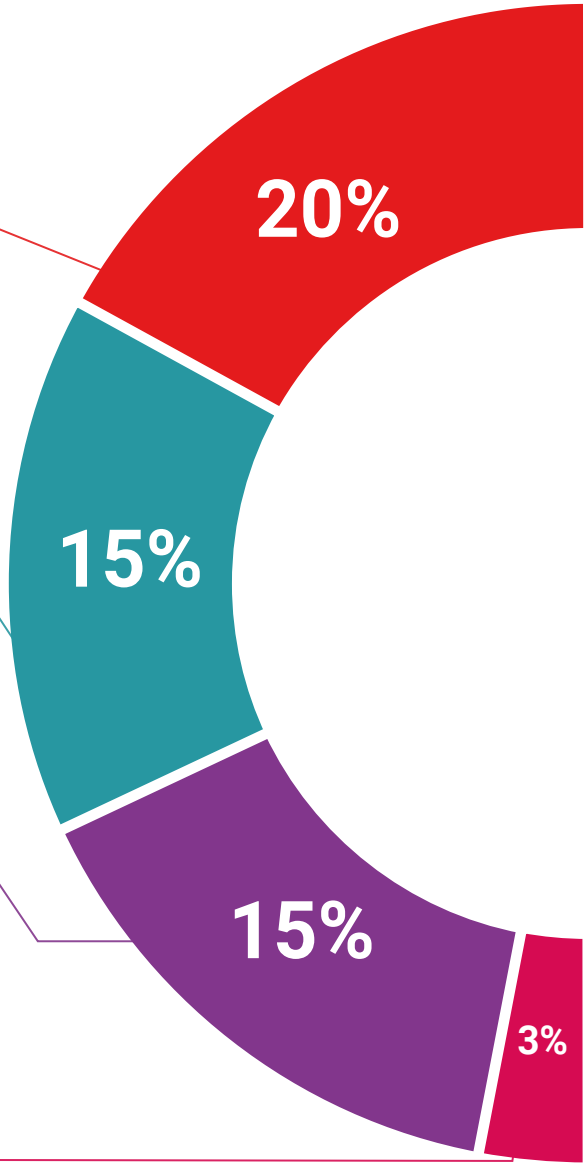
Interactive Summaries

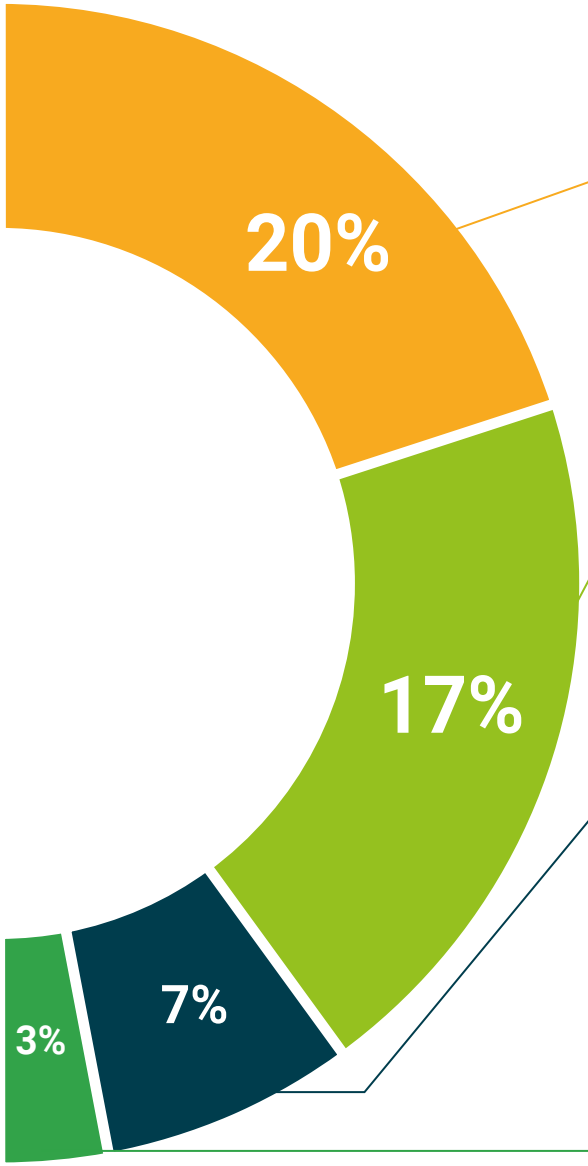
The TECH team presents the contents attractively and dynamically in multimedia lessons that include audio, videos, images, diagrams, and concept maps in order to reinforce knowledge.

This exclusive multimedia content presentation training Exclusive system 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 your goals.

Classes

There is scientific evidence on the usefulness of learning by observing experts: The system termed Learning from an Expert strengthens knowledge and recall capacity, and generates confidence in the face of difficult decisions in the future.

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 Diploma in Diagnostic Engineering and Clinical Follow-Up guarantees, in addition to the most rigorous and up-to-date training, access to a Postgraduate Diploma issued by TECH Technological University.

Successfully complete this training program and receive your university certificate without travel or laborious paperwork"

The **Postgraduate Diploma in Diagnostic Engineering and Clinical Follow-Up** contains the scientific most complete and up-to-date scientific program on the market.

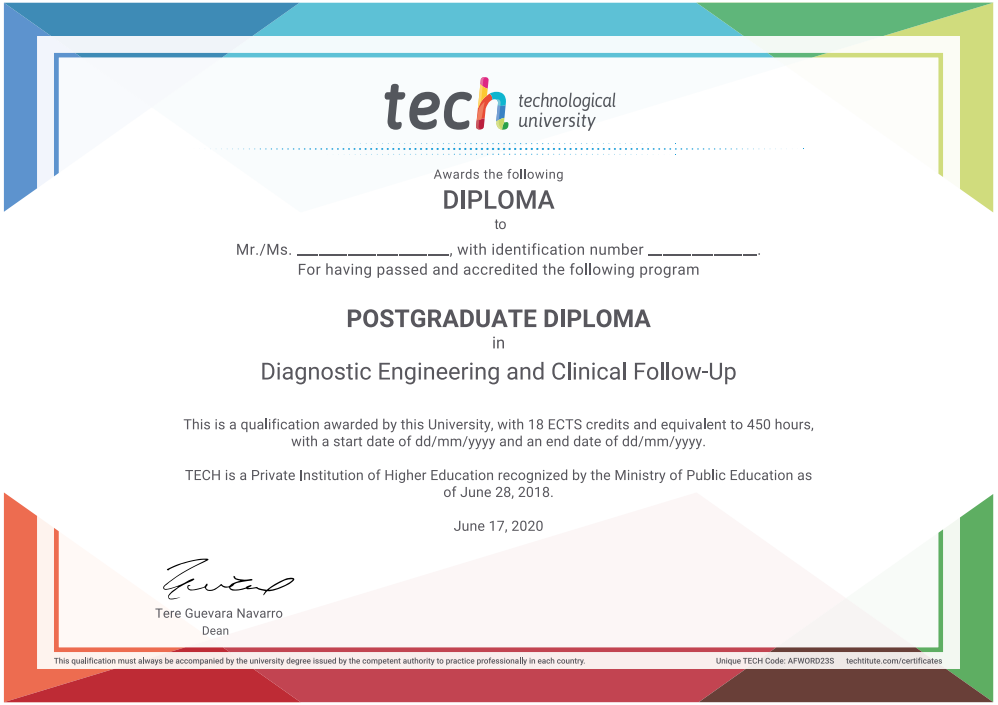
After you have passed the evaluations, you will receive your corresponding **Postgraduate Diploma** qualification issued by **TECH Technological University.**

This qualification contributes significantly to the professional's continuing education and enhances their training with a highly regarded university syllabus, and is 100% valid for all public examinations, professional careers and job vacancies.

Title: **Postgraduate Diploma in Diagnostic Engineering and Clinical Follow-Up**

ECTS: **18**

Official Number of Hours: **450 hours**


tech technological university

Awards the following

DIPLOMA

to

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

For having passed and accredited the following program

POSTGRADUATE DIPLOMA

in

Diagnostic Engineering and Clinical Follow-Up

This is a qualification awarded by this University, with 18 ECTS credits and equivalent to 450 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.

tech technological university

Postgraduate Diploma

Diagnostic Engineering and Clinical Follow-Up

Course Modality: **Online**

Duration: **6 months.**

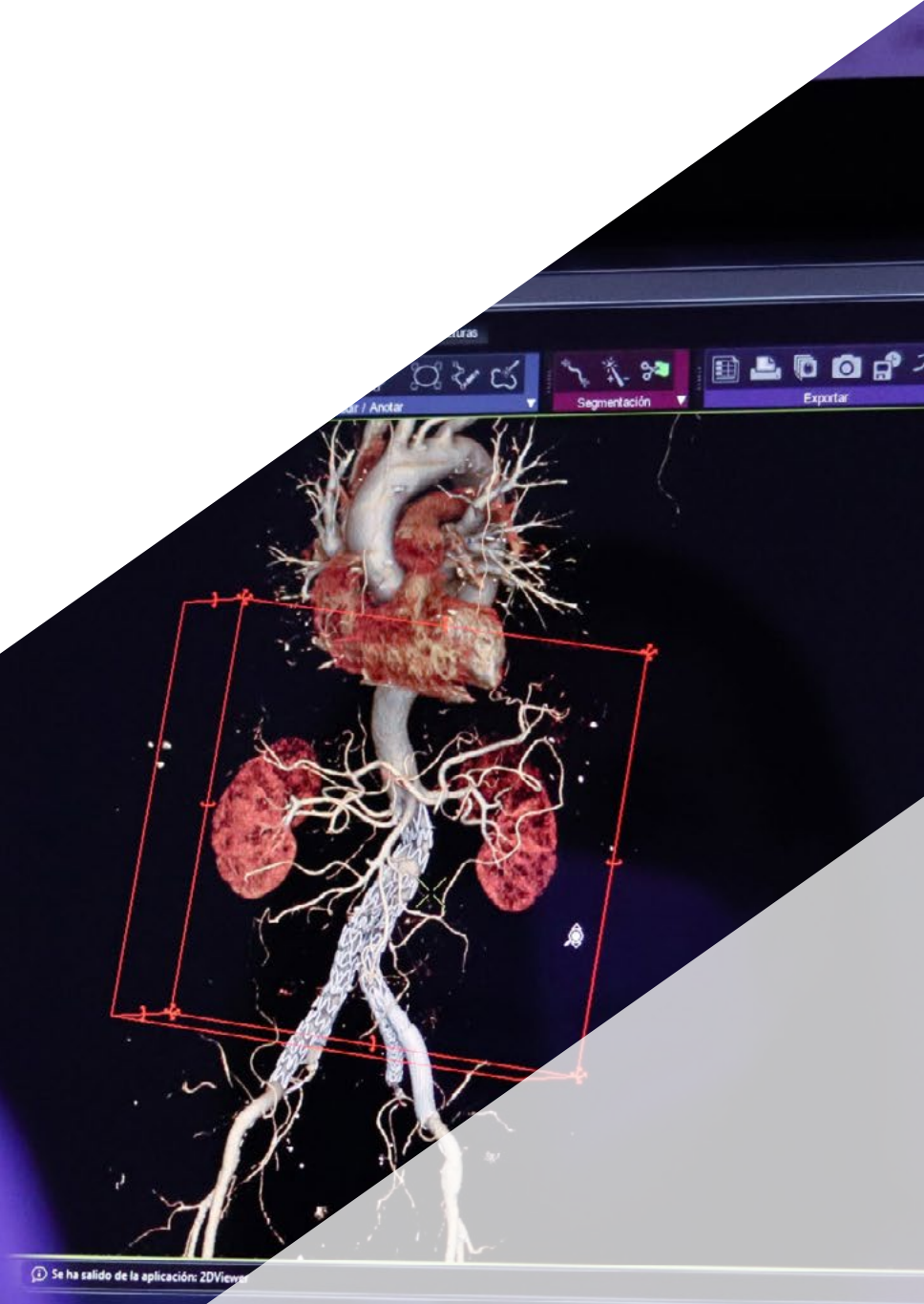
Certificate: **TECH Technological University**

18 ECTS Credits

Teaching Hours: **450 hours**

Postgraduate Diploma

Diagnostic Engineering and Clinical Follow-Up



tech technological university