

# Postgraduate Certificate Digital Health Applications in Biomedical Engineering





## Postgraduate Certificate Digital Health Applications in Biomedical Engineering

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

Website: [www.techtute.com/us/engineering/postgraduate-certificate/digital-health-applications-biomedical-engineering](http://www.techtute.com/us/engineering/postgraduate-certificate/digital-health-applications-biomedical-engineering)

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# 01

# Introduction

Clinical reality has evolved enormously in recent years, and has been strongly influenced by information technology. Patient management, databases and digital health systems dominate the day-to-day work of most hospitals. For this reason, there must be close collaboration between physicians and engineers; the latter having a greater responsibility in the development of specific applications for digital health systems. This TECH university program delves into the most pressing issues in this regard, such as medical image storage and transmission systems or the most widely used web applications in a hospital environment.







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*Access the latest developments in computational platforms and development environments with artificial intelligence”*

As the digitization of all areas of life is the order of the day, hospitals and healthcare environments have undergone an unprecedented digital transformation. Biomedical engineering experts have made a great contribution to this work, adapting the different technologies available to the demands and needs of physicians.

Some of these developments have involved different applications for managing consultations, medical care, medical records or even agenda requests and monitoring for the patients themselves. Also, as a result of the COVID19 pandemic, Telemedicine has been greatly boosted, with applications in Teleradiology, Telecardiology and Teledermatology.

This Postgraduate Certificate course explores all these issues in an up-to-date and straightforward way, so that the engineering professional can acquire the latest information in a convenient 100% online format. This means that there are no pre-set classes or schedules, which means total flexibility to balance academic, professional and personal activities. All of this with TECH's distinctive seal of quality.

This **Postgraduate Certificate in Digital Health Applications in Biomedical Engineering** contains the most complete and up-to-date program on the market. The most important features include:

- ◆ Case studies presented by experts in Biomedical Engineering
- ◆ The graphic, schematic, and practical contents with which they are created, provide scientific and practical information on the disciplines that are essential for professional practice
- ◆ Practical exercises where the self-assessment process can be carried out to improve learning
- ◆ Its special emphasis on innovative methodologies
- ◆ Theoretical lessons, questions to the expert, debate forums on controversial topics, and individual reflection assignments
- ◆ Content that is accessible from any fixed or portable device with an Internet connection



*Update your knowledge in Digital Health Applications and delve into the future trends that will govern the development of the coming years"*

“

*Lean on an expert teaching staff in the field, chosen by TECH for their extensive experience and expertise in the field of Biomedical Engineering”*

The program’s teaching staff includes professionals from 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.

*Obtain a relevant distinction for your professional profile, which will undoubtedly give you an advantage over your rivals when it comes to accessing better jobs.*

*Demonstrate your desire to continue improving and training in a field where continuous specialization is essential.*



# 02

# Objectives

The main objective of this Postgraduate Certificate is to delve into all modern technological applications of Biomedical Engineering. As a result, engineers gain a much more rigorous and up-to-date understanding of issues such as Big Data in healthcare environments, machine learning applied to Digital Health or the most modern hardware and software applications in this field.





## Medical Report

COVID-19  
Corona Virus

“

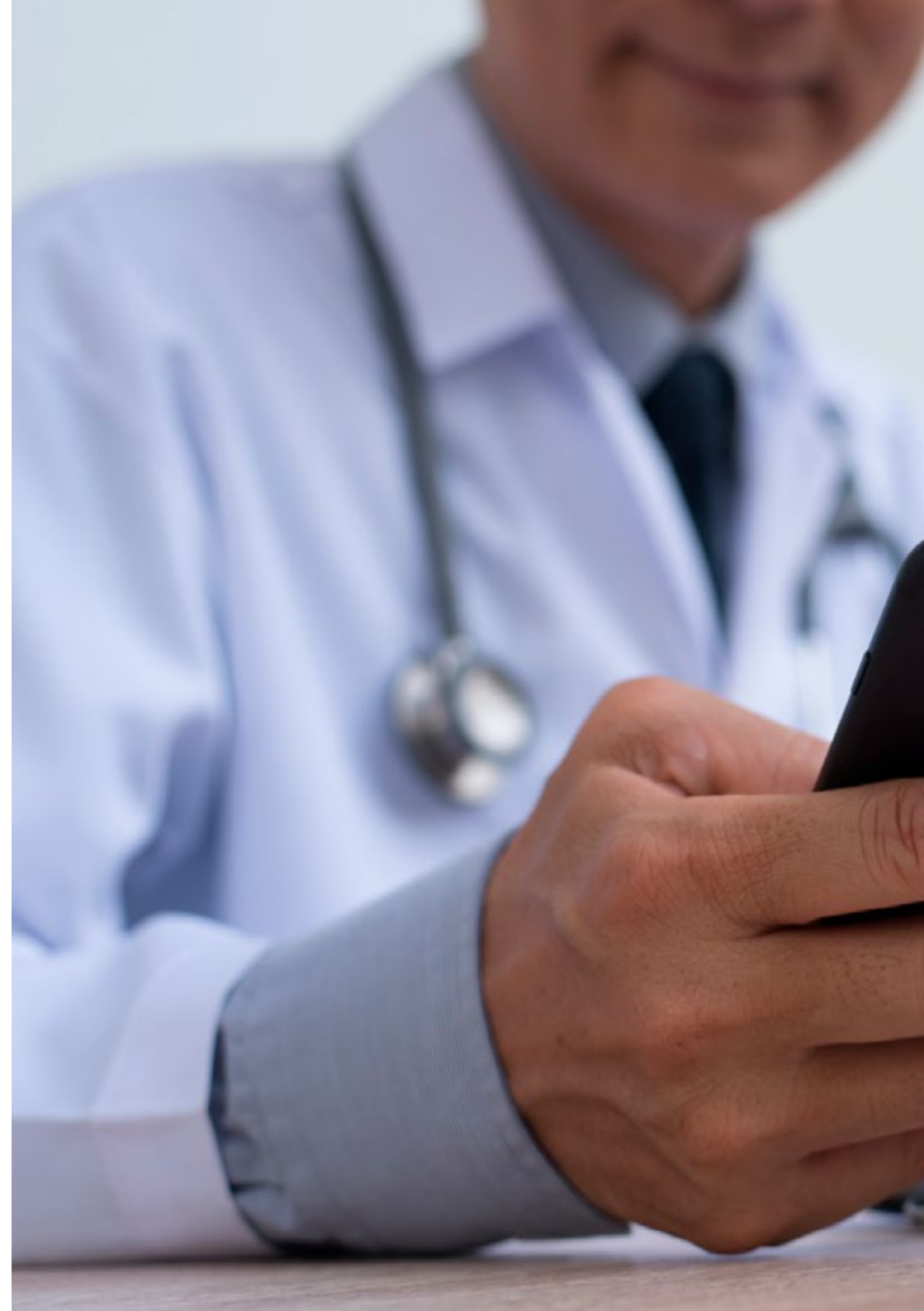
*You will get up to date in the best possible academic environment, together with the world's largest online institution"*



## General Objectives

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- ◆ 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

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- ◆ 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

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*You will have the most advanced technological and educational resources at your disposal”*

03

# Course Management

For the development of this Postgraduate Certificate, TECH has selected a number of teachers with extensive experience in Biomedical Engineering, which translates into a teaching content of the highest possible quality. Moreover, all the contents are focused on the most current clinical and engineering practice, so that the professional obtains a unique perspective that can be applied in their daily work, even before finishing the program.







*Only the best professionals in Biomedical Engineering can provide you with the right keys for you to succeed in this sector"*



## Management



### Mr. 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 Pontificia de Comillas University 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. Director of the Telemedicine Cayapas research project Knowledge transfer and management manager. Officegolden
- ◆ PhD's Degree in Biomedical Engineering from the Polytechnic University of Madrid
- ◆ Master's Degree in Telemedicine and 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

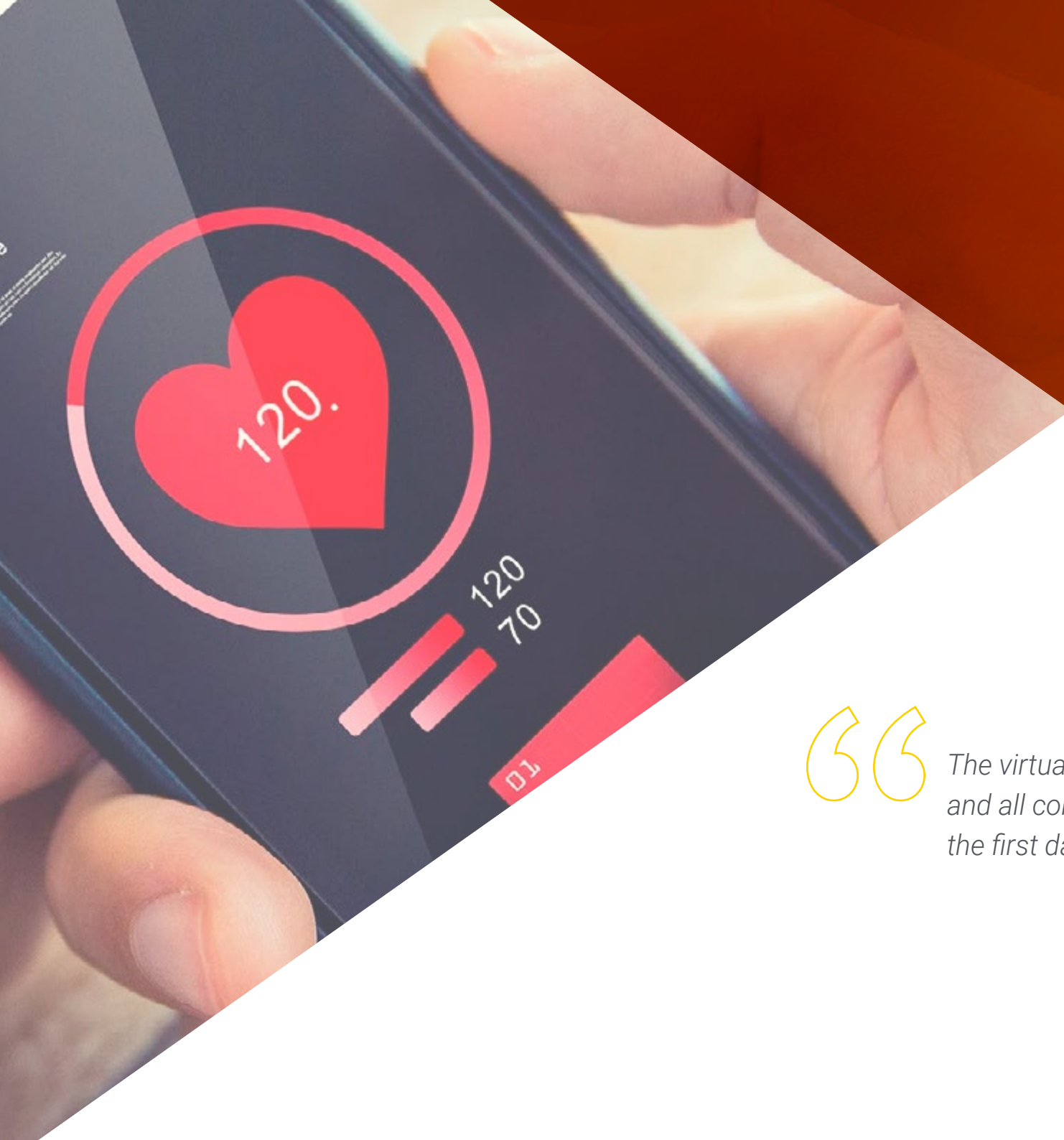


# 04

## Structure and Content

TECH's pioneering *Relearning* educational methodology greatly speeds up the professional's study process. The most complex and important terms of the entire syllabus are repeated throughout, facilitating the acquisition of all the knowledge in a way that is both progressive and natural. This represents an enormous amount of time saved for the student, who will also be supported by a large amount of supplementary material.





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*The virtual classroom is open 24/7,  
and all content will be available from  
the first day of the program"*



## Module 1. Digital Health Applications in Biomedical Engineering

- 1.1. Digital Health Applications
  - 1.1.1. Medical Hardware and Software Applications
  - 1.1.2. Software Applications: Digital Health Systems
  - 1.1.3. Usability of Digital Health Systems
- 1.2. Medical Image Storage and Transmission Systems
  - 1.2.1. Image Transmission Protocol: DICOM
  - 1.2.2. Medical Image Storage and Transmission Server Installation: PAC System
- 1.3. Relational Database Management for Digital Health Applications
  - 1.3.1. Relational Database, Concept and Examples
  - 1.3.2. Database Language
  - 1.3.3. Database with MySQL and PostgreSQL
  - 1.3.4. Applications: Connection and Uses in Web Programming Language
- 1.4. Digital Health Applications Based on Web Development
  - 1.4.1. Web Application Development
  - 1.4.2. Web Development Model, Infrastructure, Programming Languages and Working Environments
  - 1.4.3. Examples of Web Applications with Different Languages: PHP, HTML, AJAX, CSS Javascript, AngularJS, NodeJS
  - 1.4.4. Development of Applications in Web Frameworks: Symfony and Laravel
  - 1.4.5. Development of Applications in Content Management Systems, CMS: Joomla and WordPress
- 1.5. WEB Applications in a Hospital Environment or Clinical Center
  - 1.5.1. Applications for Patient Management: Reception, Appointments and Collections
  - 1.5.2. Applications for Medical Professionals: Consultations or Medical Care, Medical History, Reports, etc.
  - 1.5.3. Web and Mobile Applications for Patients: Scheduling Requests, Monitoring, etc.
- 1.6. Telemedicine Applications
  - 1.6.1. Service Architecture Models
  - 1.6.2. Telemedicine Applications Teleradiology, Teleradiology, Telecardiology and Teledermatology
  - 1.6.3. Rural Telemedicine







- 1.7. Applications with the Internet of Medical Things, IoMT
  - 1.7.1. Models and Architectures
  - 1.7.2. Medical Data Acquisition Equipment and Protocols
  - 1.7.3. Applications: Patient Monitoring
- 1.8. Digital Health Applications Using Artificial Intelligence Techniques
  - 1.8.1. Machine Learning
  - 1.8.2. Computing Platforms and Development Environments
  - 1.8.3. Examples:
- 1.9. Digital Health Applications with Big Data
  - 1.9.1. Digital Health Applications with Big Data
  - 1.9.2. Technologies Used in Big Data
  - 1.9.3. Use Cases of Big Data in Digital Health
- 1.10. Factors Associated with Sustainable Digital Health Applications and Future Trends
  - 1.10.1. Legal and Regulatory Framework
  - 1.10.2. Good Practices in the Development of Digital Health Application Projects
  - 1.10.3. Future Trends in Digital Health Applications

“Download the material of your choice and study it later or on another device. You have the freedom to choose when and where you want to study”

05

# Methodology

This academic program offers students a different way of learning. Our methodology uses a cyclical learning approach: **Relearning**.

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





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*Discover Relearning, a system that abandons conventional linear learning, to take you through cyclical teaching systems: a way of learning that has proven to be extremely effective, especially in subjects that require memorization"*



## 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.

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*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.



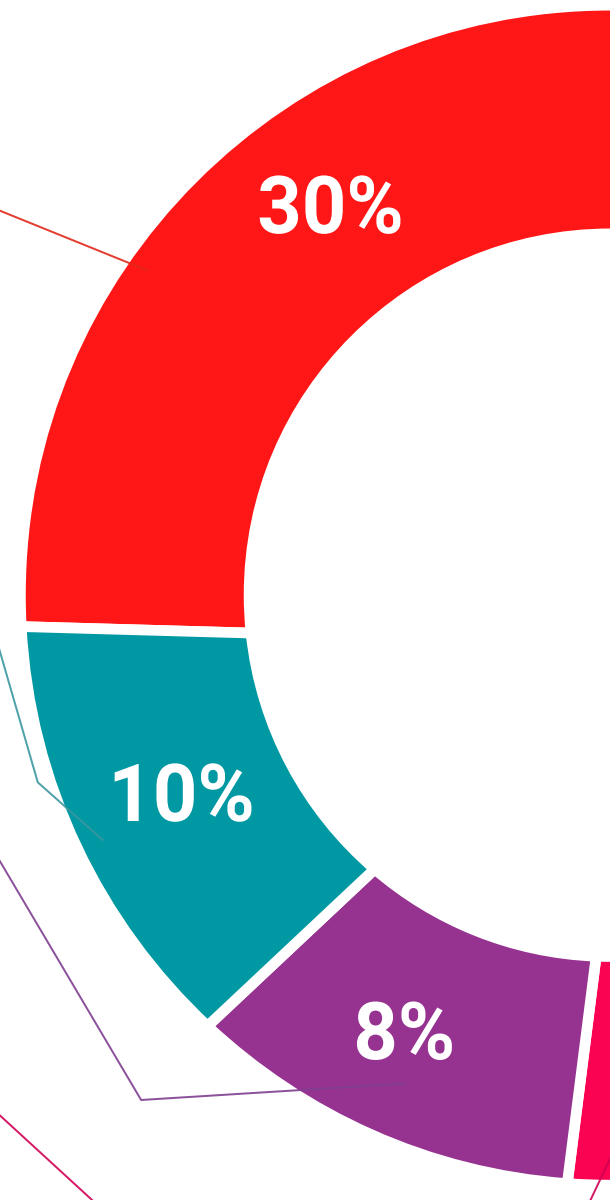
### Practising Skills and Abilities

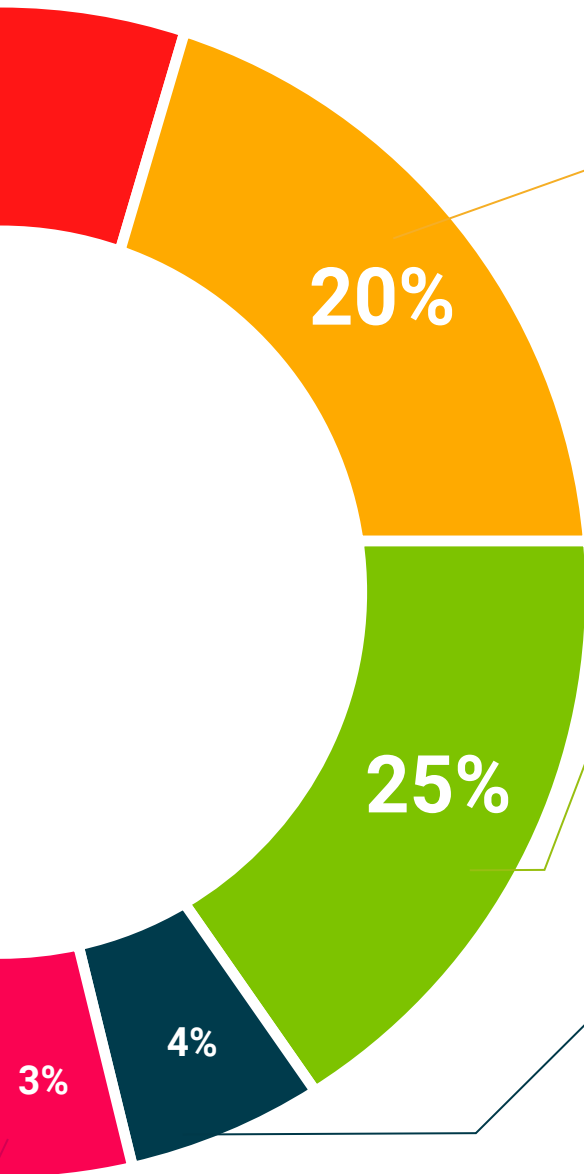
They will carry out activities to develop specific skills and abilities in each subject area. Exercises and activities to acquire and develop the skills and abilities that a specialist needs to develop in the context of the globalization that we are experiencing.



### 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 Digital Health Applications in Biomedical Engineering guarantees students, in addition to the most rigorous and up-to-date education, access to a Postgraduate Certificate issued by TECH Technological University.



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

This **Postgraduate Certificate in Digital Health Applications in Biomedical Engineering** 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** diploma 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 Digital Health Applications in Biomedical Engineering**

Official N° of hours: **150 h.**



\*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.

future  
health confidence people  
education information tutors  
guarantee accreditation teaching  
institutions technology learning  
community commitment  
personalized service innovation  
knowledge present  
development language  
virtual classroom



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