

# Postgraduate Certificate Biomedical and Healthcare Data Engineering





## Postgraduate Certificate Biomedical and Healthcare Data Engineering

- » Modality: online
- » Duration: 12 months
- » Certificate: TECH Technological University
- » Dedication: 16h/week
- » Schedule: at your own pace
- » Exams: online

Website: [www.techtitute.com/in/medicine/postgraduate-certificate/biomedical-healthcare-data-engineering](http://www.techtitute.com/in/medicine/postgraduate-certificate/biomedical-healthcare-data-engineering)

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# 01

# Introduction

Handling large amounts of documents is part of the daily work of medical professionals. The correct work and proper organization of biomedical and health databases is essential to avoid loss of information or mistakes to patients. This program is an opportunity to delve into that issue, allowing the specialist to analyze relational systems and helping to develop a conceptual modeling of data. All this, in a convenient online format, with theoretical and practical content designed by experts and with supplementary material that will allow you to learn more about each topic in a personalized way.





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*With this program you will delve into the integration of data into medical record systems, which will allow you to improve your professional productivity”*



The advancement of technology has brought countless benefits. However, one of the disadvantages that arise from this development is the handling of large amounts of data. In the field of medicine, organizing all the information in a rigorous manner is essential, not only to ensure productivity, but also because any loss or mistake could have an impact on a patient's diagnosis.

The objective of this Postgraduate Certificate is to bring the specialist closer to the most important concepts that revolve around biomedical and health databases, allowing them to have a real and practical vision of this subject. Through a journey through the conceptual modeling and design of relational databases, the specialist will be able to delve into the SQL and NoSQL languages, as well as data analysis and the legal and regulatory bases. Finally, the most important concepts of database integration in medical records will be discussed in depth.

With this complete 100% online program, the specialist will be able to invest their time in improving their knowledge thanks not only to the theoretical and practical content that makes up each topic, but also to the variety of complementary material that they will find in the Virtual Classroom.

This **Postgraduate Certificate in Biomedical and Healthcare Data Engineering** contains the most complete and up-to-date scientific program on the market. Its most notable features are:

- » Practical cases presented by experts in Biomedicine
- » 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 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



*Knowing the main relational systems for biomedical and healthcare data will make information losses in your practice zero"*

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*A unique opportunity to learn about the legal bases and regulatory standards of biomedical and health databases in order to apply them in your practice"*

The program's teaching staff includes professionals from sector 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 knowledge 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 throughout the program. For this purpose, the student will be assisted by an innovative interactive video system created by renowned and experienced experts.

*Access all the content from the beginning and download it to any device with an internet connection.*

*By choosing TECH you will be putting your educational experience in the hands of the best online university in the world.*



# 02 Objectives

The high-technical component of this Postgraduate Certificate obliges TECH to adapt its content so that the specialist is able, from the very first moment, to understand the concepts developed throughout the syllabus. For this reason, the objective of programs such as this one is to allow the graduate to take advantage of all the information that the program offers so that they can put it into practice in the day-to-day work of the company.







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*If your goal is to be a better professional, TECH has all the tools to help you achieve it"*



## 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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- » Data Structure
- » Analyze Relational Systems
- » Develop conceptual data modeling
- » Designing and standardizing a relational database
- » Examine functional dependencies between data
- » Generate specialized knowledge on big data
- » Deepen the ODMS architecture
- » Learn about data integration in medical record systems
- » Analyze the bases and restrictions



*Programs like this one are the ones that make the specialist a more prepared professional and capable of facing more challenges"*

# 03

## Course Management

As part of its commitment to offer the best and most complete programs, TECH has entrusted a group of specialists in the sector with the design and structuring of this Postgraduate Certificate. This not only guarantees the highest quality of content and its adaptation to the most modern scientific postulates, but also offers graduates the possibility of arranging individualized tutorials with experts who are always ready to help them in their academic improvement.





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*Having a group of experts in the field will help you get a practical and realistic view of the subject matter”*



## 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 Eco Brand, a fashion and recycling brand
- » Development cooperation project manager for the NGO Future Child Africa in Zimbabwe.
- » Graduate in Industrial Technologies Engineering from Pontificia University de Comillas ICAI
- » Master's Degree in Biological and Environmental Engineering from the Autonomous University of Barcelona
- » Master's Degree in Environmental Management from Spanish Open University

## Professors

### Ms. Travesí Bugallo, Blanca

- » U4Impact University Coordinator.
- » Marketing at GIANTHEALTH EVENT
- » Degree in Biomedical Engineering from the Polytechnic University of Madrid
- » Master's Degree in Biomedical Engineering from the Polytechnic University of Madrid
- » Master's Degree in Health Technology Innovation by Sorbonne Université
- » Coordinator of the Bioengineering course at the Technological Campus of ICAI.



# 04

## Structure and Content

TECH is a pioneer in relearning methodology, a learning process that combines real practical cases with the reiteration of concepts, thus making the contents developed during the program last longer in the memory. Thanks to this methodology, the specialist will not have to invest extra hours in completing the program, and will be able to take advantage of this time to continue expanding their knowledge thanks to the additional material that they will find in the Virtual Classroom.







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*In the Virtual Classroom you will have at your disposal top-quality videos prepared by teachers that will add a practical and differential touch to your academic experience"*

## Module 1. Biomedical and Healthcare Databases

- 1.1. Hospital Databases
  - 1.1.1. Data Bases
  - 1.1.2. The Importance of Data
  - 1.1.3. Data in a Clinical Context
- 1.2. Conceptual Modeling
  - 1.2.1. Data Structure
  - 1.2.2. Systematic Data Model
  - 1.2.3. Data Standardization
- 1.3. Relational Data Model
  - 1.3.1. Advantages and Disadvantages
  - 1.3.2. Formal Languages
- 1.4. Designing from Relational Databases
  - 1.4.1. Functional Dependence
  - 1.4.2. Relational Forms
  - 1.4.3. Standardization
- 1.5. SQL Language
  - 1.5.1. Relational Model
  - 1.5.2. Object-Relationship Model
  - 1.5.3. XML-Object-Relationship Model
- 1.6. NoSQL
  - 1.6.1. JSON
  - 1.6.2. NoSQL
  - 1.6.3. Differential Amplifiers
  - 1.6.4. Integrators and Differentiators





- 1.7. MongoDB
  - 1.7.1. ODMS Architecture
  - 1.7.2. NodeJS
  - 1.7.3. Mongoose
  - 1.7.4. Aggregation
- 1.8. Data Analysis
  - 1.8.1. Data Analysis
  - 1.8.2. Qualitative Analysis
  - 1.8.3. Quantitative Analysis
- 1.9. BORRAR
  - 1.9.1. General Data Protection Regulation
  - 1.9.2. Cybersecurity Considerations
  - 1.9.3. Regulations Applied to Health Data
- 1.10. Integration of Databases in Medical Records
  - 1.10.1. Medical History
  - 1.10.2. HIS Systems
  - 1.10.3. HIS Data

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*Choosing TECH means choosing: the best syllabus, a professional and committed teaching staff, the flexibility of an online program and a variety of additional content that will help you achieve all your goals"*

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"*

## At TECH we use the Case Method

What should a professional do in a given situation? Throughout the program, students will face multiple simulated clinical cases, based on real patients, in which they will have to do research, establish hypotheses, and ultimately resolve the situation. There is an abundance of scientific evidence on the effectiveness of the method. Specialists learn better, faster, and more sustainably over time.

*With TECH you will experience a way of learning that is shaking the foundations of traditional universities around the world.*



According to Dr. Gérvas, the clinical case is the annotated presentation of a patient, or group of patients, which becomes a "case", an example or model that illustrates some peculiar clinical component, either because of its teaching power or because of its uniqueness or rarity. It is essential that the case is based on current professional life, trying to recreate the real conditions in the physician's professional practice.



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*Did you know that this method was developed in 1912, at Harvard, for law students? The case method consisted of presenting students with real-life, complex situations for them to make decisions and justify their decisions on how to solve them. In 1924, Harvard adopted it as a standard teaching method”*

The effectiveness of the method is justified by four fundamental achievements:

1. Students who follow this method not only achieve the assimilation of concepts, but also a development of their mental capacity, through exercises that evaluate real situations and the application of knowledge.
2. Learning is solidly translated into practical skills that allow the student to better integrate into the real world.
3. Ideas and concepts are understood more efficiently, given that the example situations are based on real-life.
4. Students like to feel that the effort they put into their studies is worthwhile. This then translates into a greater interest in learning and more time dedicated to working on the course.





## Relearning Methodology

At TECH we enhance the case method with the best 100% online teaching methodology available: Relearning.

This university is the first in the world to combine the study of clinical cases with a 100% online learning system based on repetition, combining a minimum of 8 different elements in each lesson, a real revolution with respect to the mere study and analysis of cases.

*Professionals will learn through real cases and by resolving complex situations in simulated learning environments. These simulations are developed using state-of-the-art software to facilitate immersive learning.*



At the forefront of world teaching, the Relearning method has managed to improve the overall satisfaction levels of professionals who complete their studies, with respect to the quality indicators of the best online university (Columbia University).

With this methodology, more than 250,000 physicians have been trained with unprecedented success in all clinical specialties regardless of surgical load. Our pedagogical methodology is developed in a highly competitive environment, with a university student body with a strong socioeconomic profile and an average age of 43.5 years old.

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

In our program, learning is not a linear process, but rather a spiral (learn, unlearn, forget, and re-learn). Therefore, we combine each of these elements concentrically.

The overall score obtained by TECH's learning system is 8.01, according to the highest international standards.



This program offers the best educational material, prepared with professionals in mind:



#### Study Material

All teaching material is produced by the specialists who teach the course, specifically for the course, so that the teaching content is highly specific and precise.

These contents are then applied to the audiovisual format, to create the TECH online working method. All this, with the latest techniques that offer high quality pieces in each and every one of the materials that are made available to the student.



#### Surgical Techniques and Procedures on Video

TECH introduces students to the latest techniques, the latest educational advances and to the forefront of current medical techniques. All of this in direct contact with students and explained in detail so as to aid their assimilation and understanding. And best of all, you can watch the videos as many times as you like.



#### Interactive Summaries

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

This exclusive educational system for presenting multimedia content was awarded by Microsoft as a "European Success Story".



#### Additional Reading

Recent articles, consensus documents and international guidelines, among others. In TECH's virtual library, students will have access to everything they need to complete their course.





#### Expert-Led Case Studies and Case Analysis

Effective learning ought to be contextual. Therefore, TECH presents real cases in which the expert will guide students, focusing on and solving the different situations: a clear and direct way to achieve the highest degree of understanding.



#### Testing & Retesting

We periodically evaluate and re-evaluate students' knowledge throughout the program, through assessment and self-assessment activities and exercises, so that they can see how they are achieving their goals.



#### Classes

There is scientific evidence on the usefulness of learning by observing experts. The system known as Learning from an Expert strengthens knowledge and memory, and generates confidence in future difficult decisions.



#### Quick Action Guides

TECH offers the most relevant contents of the course in the form of worksheets or quick action guides. A synthetic, practical, and effective way to help students progress in their learning.





# 06 Certificate

The Postgraduate Certificate in Biomedical and Healthcare Data Engineering guarantees you, in addition to the most rigorous and updated education, access to a Postgraduate Certificate issued by TECH Technological University.







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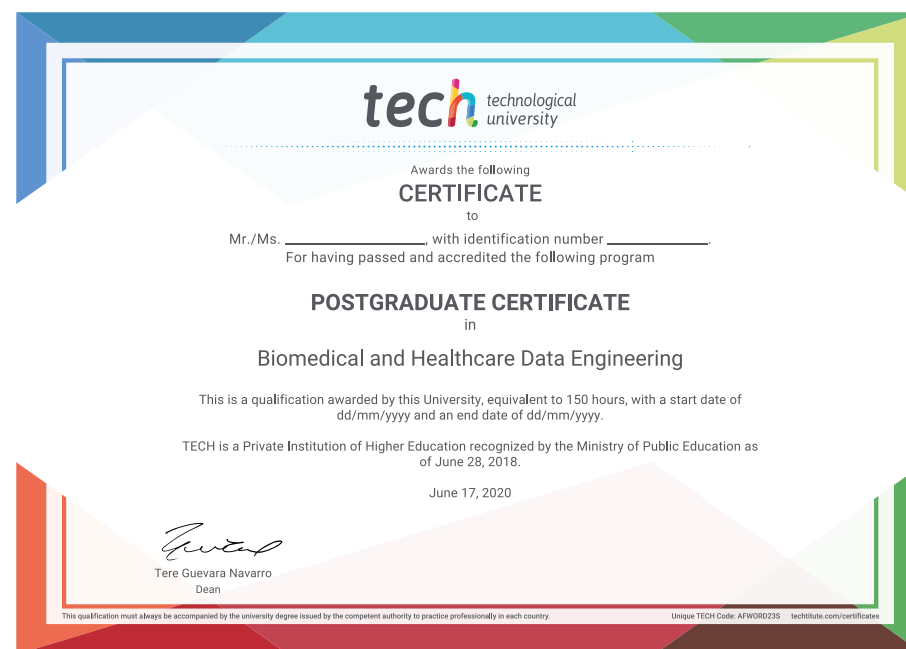
*Successfully complete this program  
and receive your university degree  
without travel or laborious paperwork”*

This **Postgraduate Certificate in Biomedical and Healthcare Data Engineering** contains the most complete and up-to-date scientific 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 Biomedical and Healthcare Data Engineering**  
Official N° of hours: **150 h.**



\*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.



**Postgraduate**

**Certificate**

Biomedical and  
Healthcare Data  
Engineering

- » Modality: online
- » Duration: 12 months
- » Certificate: TECH Technological University
- » Dedication: 16h/week
- » Schedule: at your own pace
- » Exams: online

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