

Postgraduate Certificate

Big Data in Medicine: Massive
Medical Data Processing



Postgraduate Certificate Big Data in Medicine: Massive Medical Data Processing

- » Modality: online
- » Duration: 6 weeks
- » Certificate: TECH Global University
- » Credits: 6 ECTS
- » Schedule: at your own pace
- » Exams: online

Website: www.techtute.com/us/medicine/postgraduate-certificate/big-data-medicine-massive-medical-data-processing

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01

Introduction

Massive Information Processing is one of the most used activities currently used in the health field, because it allows to gather particular aspects directly related to the scientific study of the human body within databases. In addition, Big Data provides particular tools to execute organizational activities within a medical environment, so the demand for professionals in this field is increasing. For this reason, TECH presents a program focused on updating the concepts related to the treatment of informative elements, integrating the nuances that encompass genomics and transcriptomics. This, through a 100% online methodology that will allow you to have more control over your time.





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Thanks to the updated contents of this Postgraduate Certificate, you will be able to strengthen your professional skills and increase your economic expectations"

Today, Mass Data Processing has become a necessity for medical research and practice. So, Big Data within medicine allows to properly perform the analysis and interpretation of large sets of informative material coming from different sources, such as genomics, proteomics, transcriptomics and epigenomics. However, handling large volumes of information requires specialized skills and knowledge to achieve efficient results during processing.

For this reason, we present this Postgraduate Certificate, which will allow students to acquire advanced skills when carrying out the preprocessing and visualization of large biomedical data sets. Students will also learn about the different types of high-performance technologies used for information generation, as well as the techniques and methods of this activity.

All this, 100% online, one of the many benefits offered by the Relearning methodology, allowing students the freedom to organize their study schedules and access 24 hours a day to the multimedia resources found on the virtual campus. In addition, you will have a teaching staff composed of the best experts in Big Data, who will convey the real picture of this profession and will encourage you to improve your professional skills.

This **Postgraduate Certificate in Big Data in Medicine: Massive Medical Data Processing** contains the most complete and up-to-date scientific program on the market. The most important features include:

- ♦ The development of case studies presented by experts in Big Data in Medicine: Massive Medical Data Processing
- ♦ 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
- ♦ The availability of access to content from any fixed or portable device with an Internet connection



Start this degree and be part of the best healthcare professionals specialized in Big Data"

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From the comfort of your own home and at your own pace, you will learn all the most current concepts about Big Data and its application in Medicine”

The program’s teaching staff includes professionals from sector who contribute their work experience to this educational program, as well as renowned specialists from leading societies and prestigious universities.

Its 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 an immersive education programmed to learn in real situations.

The design of this program focuses on Problem-Based Learning, by means of which the professional must try to solve the different professional practice situations that are presented throughout the academic course. This will be done with the help of an innovative system of interactive videos made by renowned experts.

Upgrade your knowledge and increase your professional expectations to the next level.

A Postgraduate Certificate that will help you strengthen your technical knowledge in transcriptomics and genomics.



02 Objectives

The main objective of this Postgraduate Certificate is to provide the student with the most important tools to effectively perform Mass Medical Data Processing. In this way, students will be able to update their knowledge in this area and improve their skills to face the particularities of this field, implementing during their educational process the multimedia materials that have been specially designed by the best professionals in Big Data.





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*Be sure that by the time you complete this degree,
you will be an expert in Mass Data Processing”*



General Objectives

- Develop key concepts of medicine that serve as a vehicle to understand clinical medicine
- Determine the major diseases affecting the human body classified by apparatus or systems, structuring each module into a clear outline of pathophysiology, diagnosis, and treatment
- Provide the necessary resources to practically apply all the concepts in the modules
- Develop the fundamental concepts of databases
- Determine the importance of medical databases





Specific objectives

- ♦ Gain specialized knowledge of massive data acquisition techniques in biomedicine
- ♦ Analyze the importance of data preprocessing in Big Data
- ♦ Determine the differences between the data derived from different massive data collection techniques, as well as their special characteristics in terms of pre-processing and handling
- ♦ Provide ways of interpreting results from massive data analysis
- ♦ Examine the applications and future trends in the field of Big Data in biomedical research and public health



A program with the most updated contents and teachings from the best experts? That's right, we are talking about this Postgraduate Certificate"

03

Course Management

The group of professors of this program has been carefully chosen by TECH and is composed of the best specialists in this field, whose objective is to provide the student with the fundamental tools for the mastery of the latest concepts related to the concentration of massive information by means of databases. In addition, the variety of disciplines represented by the professors will contribute to the student's valuable experience, as it will allow them to develop a full understanding of the real world environment of the field of study.



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Reach your goals with the best professionals in this field and become an expert in Big Data in Medicine"

Management



Ms. Sirera Pérez, Ángela

- Biomedical Engineer expert in Nuclear Medicine and exoskeleton design
- Designer of specific parts for 3D printing at Technadi
- Technician in the Nuclear Medicine area of the University Clinic of Navarra
- Degree in Biomedical Engineering from the University of Navarra
- MBA and Leadership in Healthcare and Medical Technology Companies



04

Structure and Content

The best specialists in E-Health and Big Data have designed the multimedia materials for this Postgraduate Certificate, with the aim of providing students with the latest knowledge in this field. In this way, students will have the opportunity to broaden their knowledge of the most recent advances in the creation of Biomedical Databases, through the study of practical cases that will provide them with the fundamental elements to implement strategic solutions within a real environment.





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With this curriculum you will discover the right way to integrate Big Data within the area of medicine”

Module 1. Big Data in Medicine: Massive Medical Data Processing

- 1.1. Big Data in Biomedical Research
 - 1.1.1. Data Generation in Biomedicine
 - 1.1.2. High-Throughput Technology
 - 1.1.3. Uses of High-Throughput Data. Hypotheses in the Age of Big Data
- 1.2. Data Pre-Processing in Big Data
 - 1.2.1. Data Pre-Processing
 - 1.2.2. Methods and Approaches
 - 1.2.3. Problems with Data Pre-Processing in Big Data
- 1.3. Structural Genomics
 - 1.3.1. Sequencing the Human Genome
 - 1.3.2. Sequencing vs. Chips
 - 1.3.3. Variant Discovery
- 1.4. Functional Genomics
 - 1.4.1. Functional Notation
 - 1.4.2. Mutation Risk Predictors
 - 1.4.3. Association Studies in Genomics
- 1.5. Transcriptomics
 - 1.5.1. Techniques to Obtain Massive Data in Transcriptomics: RNA-seq
 - 1.5.2. Data Normalization in Transcriptomics
 - 1.5.3. Differential Expression Studies
- 1.6. Interactomics and Epigenomics
 - 1.6.1. The Role of Chromatin in Gene Expression
 - 1.6.2. High-Throughput Studies in Interactomics
 - 1.6.3. High-Throughput Studies in Epigenetics
- 1.7. Proteomics
 - 1.7.1. Analysis of Mass Spectrometry Data
 - 1.7.2. Post-Translational Modifications Study
 - 1.7.3. Quantitative Proteomics





- 1.8. Enrichment and Clustering Techniques
 - 1.8.1. Contextualizing Results
 - 1.8.2. Clustering Algorithms in Omics Techniques
 - 1.8.3. Repositories for Enrichment: Gene Ontology and KEGG
- 1.9. Applying Big Data to Public Health
 - 1.9.1. Discovery of New Biomarkers and Therapeutic Targets
 - 1.9.2. Risk Predictors
 - 1.9.3. Personalized Medicine
- 1.10. Big Data Applied to Medicine
 - 1.10.1. Potential for Diagnostic and Preventive Assistance
 - 1.10.2. Use of Machine Learning Algorithms in Public Health
 - 1.10.3. The Problem of Privacy

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Be sure that with this Postgraduate Certificate you will achieve your goals and become the best professional in this field"

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

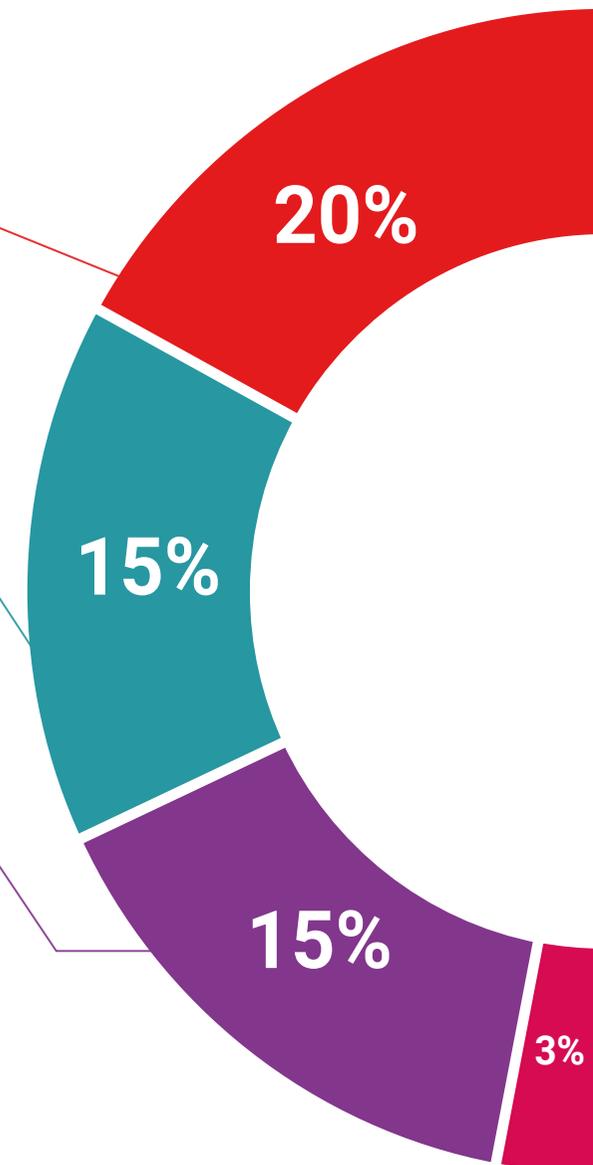
The TECH team presents the contents attractively and dynamically in multimedia lessons that include audio, videos, images, diagrams, and concept maps in order to reinforce knowledge.

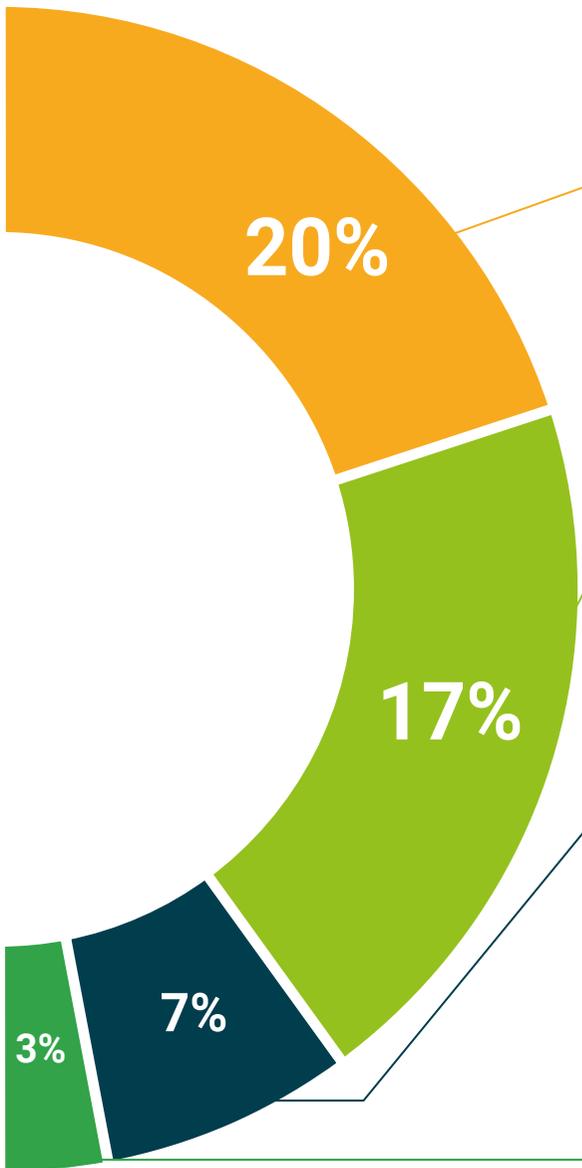
This exclusive educational system for presenting multimedia content was awarded by Microsoft as a "European Success Story".



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 Big Data in Medicine: Massive Medical Data Processing guarantees students, in addition to the most rigorous and up-to-date education, access to a Postgraduate Certificate issued by TECH Global University.



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

This program will allow you to obtain your **Postgraduate Certificate in Big Data in Medicine: Massive Medical Data Processing** endorsed by **TECH Global University**, the world's largest online university.

TECH Global University is an official European University publicly recognized by the Government of Andorra ([official bulletin](#)). Andorra is part of the European Higher Education Area (EHEA) since 2003. The EHEA is an initiative promoted by the European Union that aims to organize the international training framework and harmonize the higher education systems of the member countries of this space. The project promotes common values, the implementation of collaborative tools and strengthening its quality assurance mechanisms to enhance collaboration and mobility among students, researchers and academics.

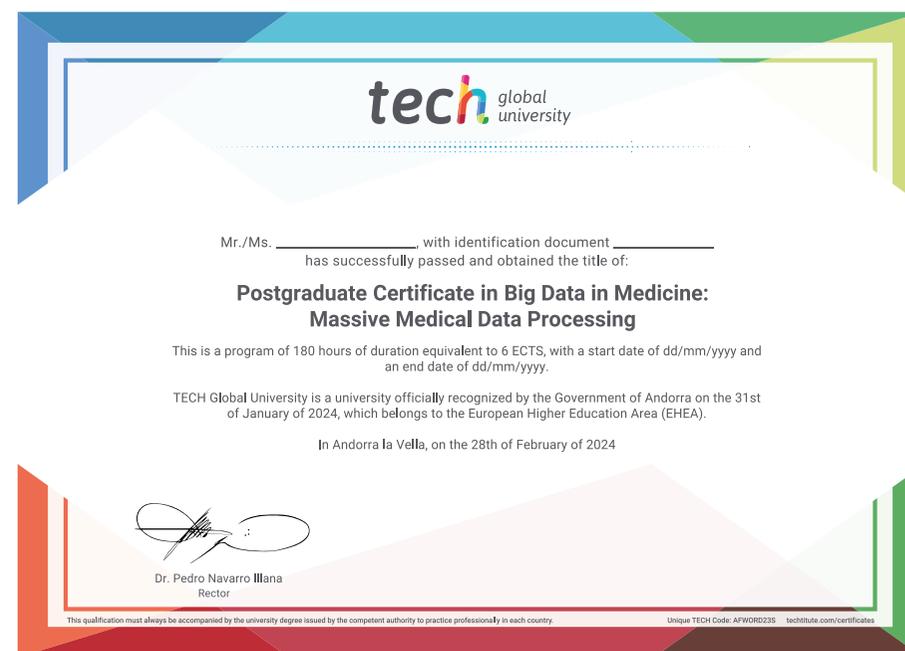
This **TECH Global University** title is a European program of continuing education and professional updating that guarantees the acquisition of competencies in its area of knowledge, providing a high curricular value to the student who completes the program.

Title: **Postgraduate Certificate in Big Data in Medicine: Massive Medical Data Processing**

Modality: **online**

Duration: **6 weeks**

Accreditation: **6 ECTS**



*Apostille Convention. In the event that the student wishes to have their paper diploma issued with an apostille, TECH Global University will make the necessary arrangements to obtain it, at an additional cost.



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