Postgraduate Certificate
Big Data Analytics and Machine Learning in Clinical Research

tech *technological university*

Postgraduate Certificate
Big Data Analytics and Machine Learning in Clinical Research

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

Website: **www.techtitute.com/us/artificial-intelligence/postgraduate-certificate/big-data-analytics-machine-learning-clinical-research**

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01

Introduction

Big Data Analytics together with Machine Learning are key in Clinical Research by providing advanced tools for processing, analyzing and extracting knowledge from large clinical datasets. For example, these tools allow the identification of specific biomarkers to assess disease progression or identify response to treatments. Aware of their benefits, more and more entities are demanding the incorporation of Machine Learning experts for the discovery of pathology patterns. To take advantage of these opportunities, professionals need to acquire competitive advantages that differentiate them from other candidates. In order to help them, TECH develops an online program that will provide the most effective strategies for the management of biomedical Big Data.

Master the interplay between Big Data and Machine Learning through 150 hours of the best digital teaching"

One of the major challenges faced by healthcare professionals in *Big Data* management lies in preserving the security of sensitive information. In the course of their respective jobs, doctors have access to private user data to take into account when planning therapies. Therefore, physicians need to learn the most effective tactics to mitigate risk in the handling of this information. In this context, they must acquire advanced skills to successfully overcome data confidentiality challenges in the field of biomedical *Big Data*

To help them with this task, TECH implements a Postgraduate Certificate that will develop the most cutting-edge practical strategies for the application of *Big Data* in clinical decision making. The curriculum will analyze the implementation of interactivity systems in visualizations to improve understanding. Along the same lines, the curriculum will delve into a wide range of effective communication tactics for graduates to present complex analysis results. In addition, didactic materials will include the exploration of success stories in the implementation of biomedical big data in clinical research.

Along these lines, TECH offers a 100% online educational environment, tailored to the needs of busy professionals seeking to advance their careers. In addition, it will employ the *Relearning* methodology, based on the repetition of key concepts to fix knowledge and facilitate learning. In this way, the combination of flexibility and a robust pedagogical approach makes it highly accessible. Students will also have access to a library full of multimedia resources in different multimedia formats such as interactive summaries, explanatory videos and infographics. All that will be required is that experts have an electronic device with Internet access to access the Virtual Campus, where they will find the most dynamic academic content on the market.

This **Postgraduate Certificate in Big Data Analytics and Machine Learning in Clinical Research** contains the most complete and up-to-date program on the market. The most important features include:

- Development of practical cases presented by experts in Big Data Analytics and Machine Learning in Clinical Research
- 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

You will develop Artificial Intelligence algorithms to predict clinical outcomes, optimize treatment protocols and improve efficiency in the identification of relevant biomarkers"

"You will address the integration of Big Data and Machine Learning in Clinical Research, improving your understanding about the most complex diseases"

You will delve into Data Mining in clinical records to extract valuable patterns, all through innovative multimedia resources.

Thanks to the Relearning system used by TECH you will reduce the long hours of study and memorization.

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

The multimedia content, developed with the latest educational technology, will provide the professional with situated and contextual learning, i.e., a simulated environment that will provide immersive education programmed to learn in real situations.

This program is designed around Problem-Based Learning, whereby the professional must try to solve the different professional practice situations that arise during the academic year For this purpose, the students will be assisted by an innovative interactive video system created by renowned and experienced experts.

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Objectives

This university program will equip physicians with a solid understanding of Big Data analytical tools and the use of Machine Learning algorithms in the clinical setting. Graduates will apply the most effective strategies to explore large medical datasets, extracting important patterns that can foster meaningful discoveries in medicine. Professionals will also gain practical skills to apply Artificial Intelligence models to their procedures, to individualize therapies and significantly improve clinical decision making.

You will dig into Big Data analytics applied to clinical data, including the acquisition, cleaning and exploration of large biomedical datasets"

General Objective

- Gain a solid understanding of the concepts of *Big Data* in the clinical setting and become familiar with essential tools for its analysis

" A unique, key, and decisive educational experience to boost your professional development"

Specific Objectives

- Gain a solid understanding of the concepts fundamental of *Big Data* in the clinical setting and become familiar with essential tools used for its analysis

- Explore advanced data mining techniques, machine learning algorithms, predictive analytics, and AI applications in epidemiology and public health

- Analyze biological networks and disease patterns to identify connections and potential treatments

- Address data security and manage the challenges associated with large volumes of data in biomedical research

- Investigate case studies that demonstrate the potential of *Big Data* in biomedical research

Course Management

The faculty of this Postgraduate Certificate brings together leading experts in the field of medicine and technology, offering an exceptionally comprehensive and up-to-date perspective. These professionals not only possess in-depth knowledge in Artificial Intelligence applied to clinical practice, but also vast practical experience in the development and implementation of innovative solutions in medical settings. Their dedication to educational excellence will ensure that graduates not only acquire theoretical knowledge, but also a thorough practical understanding. This way they will be highly prepared to successfully face the challenges that arise during the exercise of their work.

"

Get updated in Big Data Analysis from the best experts in the field. Launch your professional career with TECH!"

Management

Dr. Peralta Martín-Palomino, Arturo

- CEO and CTO at Prometeus Global Solutions
- CTO at Korporate Technologies
- CTO at AI Shepherds GmbH
- Consultant and Strategic Business Advisor at Alliance Medical
- Director of Design and Development at DocPath
- Ph.D. in Psychology from the University of Castilla - La Mancha
- Ph.D. in Economics, Business and Finance from the Camilo José Cela University
- Ph.D. in Psychology from University of Castilla – La Mancha
- Máster in Executive MBA por la Universidad Isabel I
- Master's Degree in Sales and Marketing Management, Isabel I University
- Expert Master's Degree in Big Data by Hadoop Training
- Master's Degree in Advanced Information Technologies from the University of Castilla - la Mancha
- Member of: SMILE Research Group

Mr. Popescu Radu, Daniel Vasile

- Pharmacology, Nutrition and Diet Specialist
- Freelance Producer of Didactic and Scientific Contents
- Nutritionist and Community Dietitian
- Community Pharmacist
- Researcher
- Master's Degree in Nutrition and Health at the Universidad Oberta de Catalunya
- Master's Degree in Psychopharmacology, University of Valencia
- Pharmacist by the Complutense University of Madrid
- Nutritionist-Dietician by the European University Miguel de Cervantes

Professors

Dr. Carrasco González, Ramón Alberto
- Computer Science and Artificial Intelligence Specialist
- Researcher
- Head of *Business Intelligence* (Marketing) at Caja General de Ahorros de Granada and Banco Mare Nostrum
- Head of Information Systems (*Data Warehousing and Business Intelligence*) at Caja General de Ahorros de Granada and Banco Mare Nostrum
- Ph.D. in Artificial Intelligence, University of Granada
- Computer Engineer from the University of Granada

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Structure and Content

This Postgraduate Certificate will focus on the *Big Data* tools most commonly used in Clinical Research, thus immersing in Data Mining in clinical and biomedical records. The academic itinerary will delve into various predictive analysis techniques that will improve clinical prognoses. The syllabus will also address Machine Learning models in epidemiology and public health, as well as the analysis of biological networks to understand the patterns of pathologies. In addition, the didactic contents will develop predictive tools, advanced visualization skills and communication of complex data.

"

You will acquire skills to address significant challenges, such as the efficient management of large volumes of information, analyzing their practical applications in the biomedical sector"

Module 1. *Big Data* Analytics and Machine Learning in Clinical Research

1.1. *Big Data* in Clinical Research: Concepts and Tools
   1.1.1. The Explosion of Data in Clinical Research
   1.1.2. Concept of *Big Data* and Main Tools
   1.1.3. Applications of *Big Data* in Clinical Research

1.2. Data Mining in Clinical and Biomedical Registries
   1.2.1. Main Methodologies for Data Mining
   1.2.2. Data Integration from Clinical and Biomedical Registries
   1.2.3. Detection of Patterns and Anomalies in Biomedical and Clinical Records

1.3. Machine Learning Algorithms in Biomedical Research
   1.3.1. Classification Techniques in Biomedical Research
   1.3.2. Regression Techniques in Biomedical Research
   1.3.4. Unsupervised Techniques in Biomedical Research

1.4. Predictive Analytics Techniques in Clinical Research
   1.4.1. Classification Techniques in Clinical Research
   1.4.2. Regression Techniques in Clinical Research
   1.4.3. *Deep Learning* in Clinical Research

1.5. AI Models in Epidemiology and Public Health
   1.5.1. Classification Techniques in Epidemiology and Public Health
   1.5.2. Regression Techniques in Epidemiology and Public Health
   1.5.3. Unsupervised Techniques in Epidemiology and Public Health

1.6. Analysis of Biological Networks and Disease Patterns
   1.6.1. Exploration of Interactions in Biological Networks for the Identification of Disease Patterns
   1.6.2. Integration of Omics Data in Network Analysis to Characterize Biological Complexities
   1.6.3. Application of *machine learning* Algorithms for Disease Pattern Discovery

1.7. Development of Tools for Clinical Prognostics
   1.7.1. Creation of Innovative Tools for Clinical Prognosis Based on Multidimensional Data
   1.7.2. Integration of Clinical and Molecular Variables in the Development of Prognostic Tools
   1.7.3. Evaluating the Effectiveness of Prognostic Tools in Various Clinical Contexts

As it is an online Postgraduate Certificate, you will be able to combine your studies with the rest of your daily activities"

Methodology

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

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

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

Case Study to contextualize all content

Our program offers a revolutionary approach to developing skills and knowledge. Our goal is to strengthen skills in a changing, competitive, and highly demanding environment.

" *At TECH, you will experience a learning methodology that is shaking the foundations of traditional universities around the world"*

You will have access to a learning system based on repetition, with natural and progressive teaching throughout the entire syllabus.

The student will learn to solve complex situations in real business environments through collaborative activities and real cases.

A learning method that is different and innovative

This TECH program is an intensive educational program, created from scratch, which presents the most demanding challenges and decisions in this field, both nationally and internationally. This methodology promotes personal and professional growth, representing a significant step towards success. The case method, a technique that lays the foundation for this content, ensures that the most current economic, social and professional reality is taken into account.

❝

Our program prepares you to face new challenges in uncertain environments and achieve success in your career"

The case method has been the most widely used learning system among the world's leading Information Technology schools for as long as they have existed. 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 course, students 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 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.

01 learning from evidence

02 relearning from evidence

03 testing

04 learning from an expert

05 neurocognitive context dependent learning

06 Von-Restorff effect

07 case based learning through storytelling

08 competencies testing (retesting)

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.
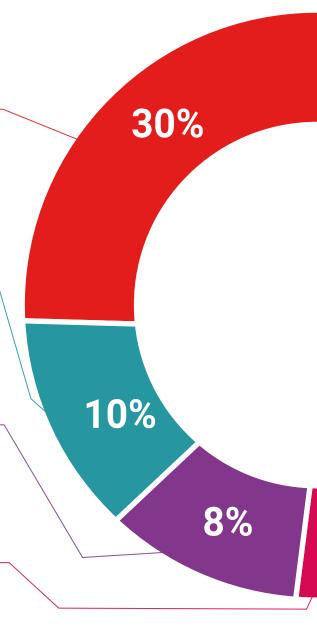
Practising Skills and Abilities

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.

30%

10%

8%

20%

25%

4%

3%

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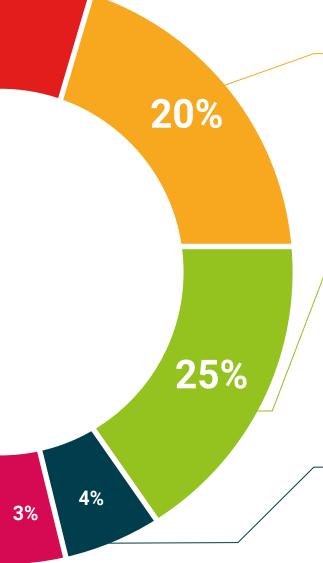
This exclusive educational system for presenting multimedia content was awarded by Microsoft as a "European Success Story".

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.

Certificate

The Postgraduate Certificate in Big Data Analytics and Machine Learning in Clinical Research guarantees students, in addition to the most rigorous and up-to-date education, access to a Postgraduate Certificate issued by TECH Technological University.

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

This **Postgraduate Certificate in Big Data Analytics and Machine Learning in Clinical Research** contains the most complete and up-to-date program on the market.

After the student has passed the assessments, they will receive their corresponding **Postgraduate Certificate** issued by **TECH Technological University** via tracked delivery*.

The diploma issued by **TECH Technological University** will reflect the qualification obtained in the Postgraduate Certificate, and meets the requirements commonly demanded by labor exchanges, competitive examinations, and professional career evaluation committees.

Title: **Postgraduate Certificate in Big Data Analytics and Machine Learning in Clinical Research**

Official Nº of Hours: **150 h.**

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Awards the following

DIPLOMA

to

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

For having passed and accredited the following program

POSTGRADUATE CERTIFICATE

in

Big Data Analytics and Machine Learning in Clinical Research

This is a qualification awarded by this University, equivalent to 150 hours, with a start date of dd/mm/yyyy and an end date of dd/mm/yyyy.

TECH is a Private Institution of Higher Education recognized by the Ministry of Public Education as of June 28, 2018.

June 17, 2020

Tere Guevara Navarro
Dean

Unique TECH Code: AFWORD23S   techtitute.com/certificates

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

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