

# Postgraduate Certificate

## Big Data and Predictive Analytics in Medical Imaging





## Postgraduate Certificate Big Data and Predictive Analytics in Medical Imaging

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

Website: [www.techtute.com/us/artificial-intelligence/postgraduate-certificate/big-data-predictive-analytics-medical-imaging](http://www.techtute.com/us/artificial-intelligence/postgraduate-certificate/big-data-predictive-analytics-medical-imaging)

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# 01

# Introduction

Industry 4.0 has had a significant impact on the field of Medical Imaging by incorporating advanced Big Data and Predictive Analytics tools. In this sense, the accumulation of large volumes of data from medical images, together with the development of algorithms, is allowing doctors to predict the evolution of pathologies and personalize treatments more effectively. For this reason, specialists must incorporate the most innovative techniques into their clinical practice to detect hidden patterns that make it possible to identify diseases in early stages, predict the evolution of pathologies and personalize treatments more effectively. Within this framework, TECH presents an exclusive online program focused on Big Data and Predictive Analytics in Medical Imaging.





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*Through this Postgraduate Certificate based on Relearning, you will design Deep Learning models that analyze medical images and predict the appearance of diseases such as Cancer”*



The use of Big Data and Predictive Analytics in Medical Imaging is transforming the way healthcare professionals approach the diagnosis and treatment of diseases. So much so that the World Health Organization reveals in a recent report that 70% of clinical decisions are based on information obtained from imaging studies, underscoring the importance of improving accuracy and efficiency in their interpretation. Faced with this situation, physicians need to combine image data with Artificial Intelligence algorithms to predict the evolution of cardiac and oncological diseases, reducing diagnosis times.

In this context, TECH is launching a revolutionary program in Big Data and Predictive Analytics in Medical Imaging. Designed by references in this field, the academic itinerary will delve into areas ranging from Data Mining in biomedical image records with IBM Watson Imaging or applications of clustering and classification techniques in image records to computational models to simulate biological networks visible in images. The program will also delve into the most sophisticated visualization methods for the multidimensional representation of image data. Therefore, graduates will develop advanced clinical skills to implement algorithms that automate image segmentation, anomaly detection and pathology classification in various imaging modalities.

In addition, in terms of the program methodology, TECH is based on its revolutionary Relearning teaching system. This method consists of the progressive reiteration of key concepts to ensure that physicians achieve a full understanding of the content. In addition, for access to all the didactic resources, the only thing that graduates will need is an electronic device with an Internet connection (such as a cell phone, tablet or computer). Therefore, specialists will enter the Virtual Campus and will enjoy a variety of multimedia resources present in formats such as explanatory videos.

This **Postgraduate Certificate in Big Data and Predictive Analytics in Medical Imaging** 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 Artificial Intelligence
- The graphic, schematic and eminently practical contents with which it is conceived gather scientific and practical information on those disciplines that are indispensable 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



*The Virtual Campus  
will be available 24  
hours a day for you  
to access at a time  
that suits you best”*

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*Are you looking to handle advanced data visualization tools to represent findings in an understandable way for clinical practice? Achieve it through this program”*

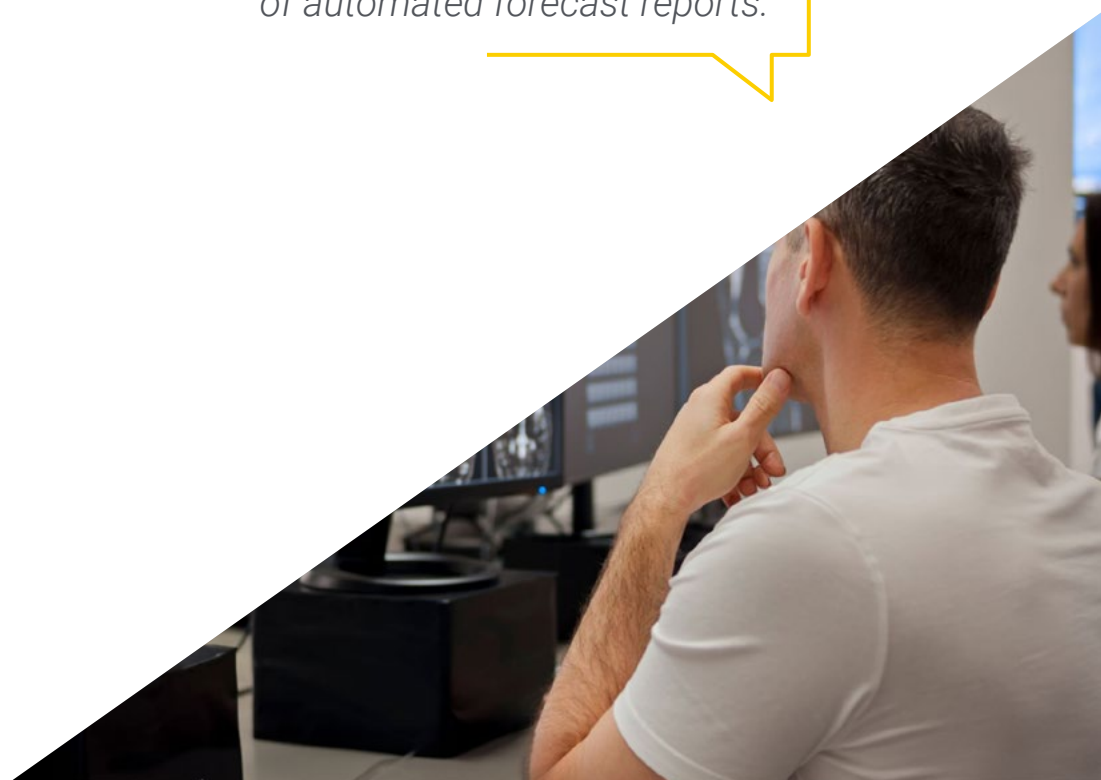
The program's teaching staff includes professionals from the field who contribute their work experience to this educational program, as well as renowned specialists from leading societies and prestigious universities.

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 course. For this purpose, students will be assisted by an innovative interactive video system created by renowned and experienced experts.

*The 100% online methodology characteristic of this program will allow you to enjoy an excellent update without depending on strict pre-established schedules.*

*You will delve into the most recent advances in the generation of automated forecast reports.*



# 02

# Objectives

Through this Postgraduate Certificate, experts will acquire advanced skills to manage and analyze large volumes of medical imaging data to extract relevant information to improve diagnostic accuracy. In this sense, professionals will be able to use sophisticated Predictive Analytics techniques such as Machine learning or Deep Learning to predict the onset, progression and response to treatment of various conditions (such as Cancer, Cardiovascular Diseases or Neurological Disorders) from image data.





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*You will implement algorithms that automate image segmentation, anomaly detection and pathology classification in different imaging modalities”*



## General Objectives

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- Understand the theoretical foundations of Artificial Intelligence
- Study the different types of data and understand the data life cycle
- Evaluate the crucial role of data in the development and implementation of AI solutions
- Delve into algorithms and complexity to solve specific problems
- Explore the theoretical basis of neural networks for Deep Learning development
- Explore bio-inspired computing and its relevance in the development of intelligent systems
- Develop skills to use and apply advanced Artificial Intelligence tools in the interpretation and analysis of medical images, improving diagnostic accuracy
- Implement Artificial Intelligence solutions that allow the automation of processes and the personalization of diagnostics
- Apply Data Mining and Predictive Analytics techniques to make evidence-based clinical decisions
- Acquire research skills that allow experts to contribute to the advancement of Artificial Intelligence in medical imaging





## Specific Objectives

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- ♦ Manage large volumes of data using Data Mining techniques and Machine Learning algorithms
- ♦ Create clinical prognostic tools based on Big Data analysis in order to optimize clinical decisions

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*The specialized readings will allow you to further extend the rigorous information provided in this academic option"*





# 03

# Course Management

TECH's priority is to make available to anyone the most complete and updated programs in the academic panorama, which is why it carries out a thorough process to constitute its teaching staff. Thanks to this effort, this Postgraduate Certificate has the participation of recognized experts in Big Data and Predictive Analytics in Medical Imaging. These professionals have a vast professional background, where they have been part of prestigious institutions to predict the evolution of diseases such as Cancer or Neurological Disorders. Therefore, graduates will have access to an intensive experience that will allow them to optimize their daily clinical practice.



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*You will access a curriculum designed by authentic references in Big Data and Predictive Analytics in Medical Imaging”*



## Management



### **Dr. Peralta Martín-Palomino, Arturo**

- ♦ CEO and CTO at Prometheus Global Solutions
- ♦ CTO at Korporate Technologies
- ♦ CTO at AI Shephers GmbH
- ♦ Consultant and Strategic Business Advisor at Alliance Medical
- ♦ Director of Design and Development at DocPath
- ♦ PhD. in Psychology from the University of Castilla La Mancha
- ♦ PhD in Economics, Business and Finance from the Camilo José Cela University
- ♦ PhD 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



## Professors

### Mr. Popescu Radu, Daniel Vasile

- ◆ Independent Specialist in Pharmacology, Nutrition and Dietetics
- ◆ Freelance Producer of Teaching and Scientific Content
- ◆ Nutritionist and Community Dietitian
- ◆ Community Pharmacist
- ◆ Researcher
- ◆ Master's Degree in Nutrition and Health at the Open University of Catalonia
- ◆ Master's Degree in Psychopharmacology from the University of Valencia
- ◆ Pharmacist from the Complutense University of Madrid
- ◆ Nutritionist-Dietitian by the European University Miguel de Cervantes

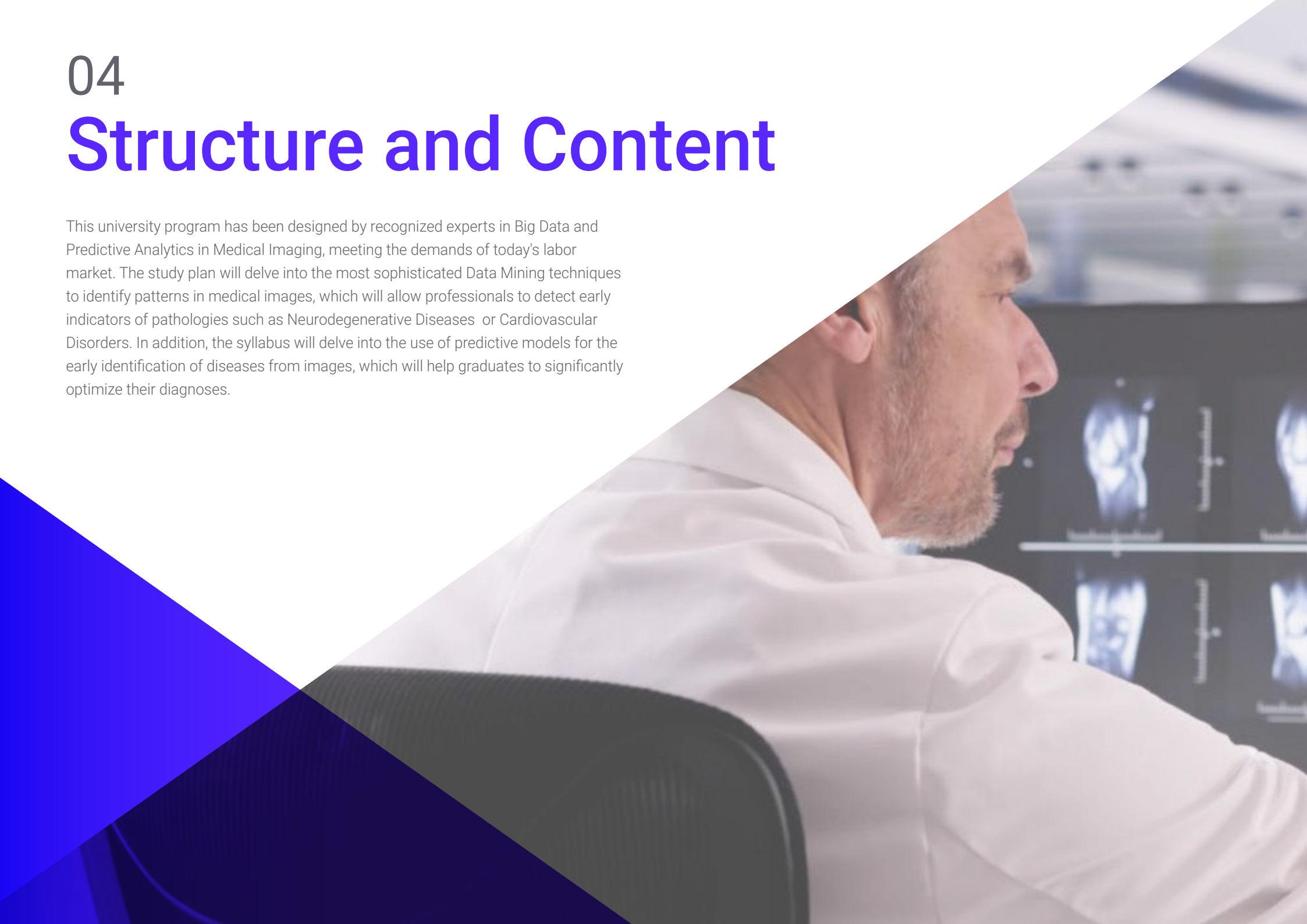


*Take the opportunity to learn about the latest advances in this field in order to apply it to your daily practice"*

# 04

## Structure and Content

This university program has been designed by recognized experts in Big Data and Predictive Analytics in Medical Imaging, meeting the demands of today's labor market. The study plan will delve into the most sophisticated Data Mining techniques to identify patterns in medical images, which will allow professionals to detect early indicators of pathologies such as Neurodegenerative Diseases or Cardiovascular Disorders. In addition, the syllabus will delve into the use of predictive models for the early identification of diseases from images, which will help graduates to significantly optimize their diagnoses.



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*You will be able to train Deep Learning models to analyze medical images and predict the evolution of complex diseases such as Cancer”*



## Module 1. Big Data and Predictive Analytics in Medical Imaging

- 1.1. Big Data in Diagnostic Imaging: Concepts and Tools with GE Healthcare Edison
  - 1.1.1. Fundamentals of Big Data applied to Imaging
  - 1.1.2. Technological Tools and Platforms for Handling Large Volumes of Imaging Data
  - 1.1.3. Challenges in the Integration and Analysis of Big Data in Imaging
  - 1.1.4. Use Cases of Big Data in Diagnostic Imaging
- 1.2. Data Mining in Biomedical Image Registries with IBM Watson Imaging
  - 1.2.1. Advanced Data Mining Techniques to Identify Patterns in Medical Images
  - 1.2.2. Strategies for Extracting Relevant Features in Large Image Databases
  - 1.2.3. Applications of Clustering and Classification Techniques in Image Registries
  - 1.2.4. Impact of Data Mining on Improving Diagnosis and Treatment
- 1.3. Machine Learning Algorithms in Image Analysis with Google DeepMind Health
  - 1.3.1. Development of Supervised and Unsupervised Algorithms for Medical Imaging
  - 1.3.2. Innovations in Machine Learning Techniques for Recognition of Disease Patterns
  - 1.3.3. Applications of Deep Learning in Image Segmentation and Classification
  - 1.3.4. Evaluation of the Efficacy and Accuracy of Machine Learning Algorithms in Clinical Studies
- 1.4. Predictive Analytics Techniques Applied to Diagnostic Imaging with Predictive Oncology
  - 1.4.1. Predictive Models for the Early Identification of Diseases from Images
  - 1.4.2. Use of Predictive Analytics for Monitoring and Treatment Evaluation
  - 1.4.3. Integration of Clinical and Imaging Data to Enrich Predictive Models
  - 1.4.4. Challenges in the Implementation of Predictive Techniques in Clinical Practice
- 1.5. Image-Based Artificial Intelligence Models for Epidemiology with BlueDot
  - 1.5.1. Application of Artificial Intelligence in the Analysis of Epidemic Outbreaks Using Images
  - 1.5.2. Models of Disease Spread Visualized by Imaging Techniques
  - 1.5.3. Correlation Between Epidemiological Data and Imaging Findings
  - 1.5.4. Contribution of Artificial Intelligence to the Study and Control of Pandemics





- 1.6. Analysis of Biological Networks and Disease Patterns from Images
  - 1.6.1. Application of Network Theory in the Analysis of Images to Understand Pathologies
  - 1.6.2. Computational Models to Simulate Biological Networks Visible in Images
  - 1.6.3. Integration of Image Analysis and Molecular Data for Mapping Diseases
  - 1.6.4. Impact of these Analyses on the Development of Personal Therapies
- 1.7. Development of Image-Based Tools for Clinical Prognosis
  - 1.7.1. Artificial Intelligence Tools for the Prediction of Clinical Course from Diagnostic Images
  - 1.7.2. Advances in the Generation of Automated Prognostic Reports
  - 1.7.3. Integration of Prognostic Models in Clinical Systems
  - 1.7.4. Validation and Clinical Acceptance of AI-Based Prognostic Tools
- 1.8. Advanced Visualization and Communication of Complex Data with Tableau
  - 1.8.1. Visualization Techniques for the Multidimensional Representation of Image Data
  - 1.8.2. Interactive Tools for the Exploration of Large Image Datasets
  - 1.8.3. Strategies for Effective Communication of Complex Findings Through Visualizations
  - 1.8.4. Impact of Advanced Visualization on Medical Education and Decision Making
- 1.9. Data Security and Challenges in Big Data Management
  - 1.9.1. Security Measures to Protect Large Volumes of Medical Imaging Data
  - 1.9.2. Challenges in Privacy and Ethics of Large-Scale Image Data Management
  - 1.9.3. Technological Solutions for the Secure Management of Healthcare Big Data
  - 1.9.4. Case Studies on Security Breaches and how they Were Addressed
- 1.10. Practical Applications and Case Studies on Biomedical Big Data
  - 1.10.1. Examples of Successful Applications of Big Data in the Diagnosis and Treatment of Diseases
  - 1.10.2. Case Studies on the Integration of Big Data in Healthcare Systems
  - 1.10.3. Lessons Learned from Big Data Projects in the Biomedical Field
  - 1.10.4. Future Directions and Potentials of Big Data in Medicine



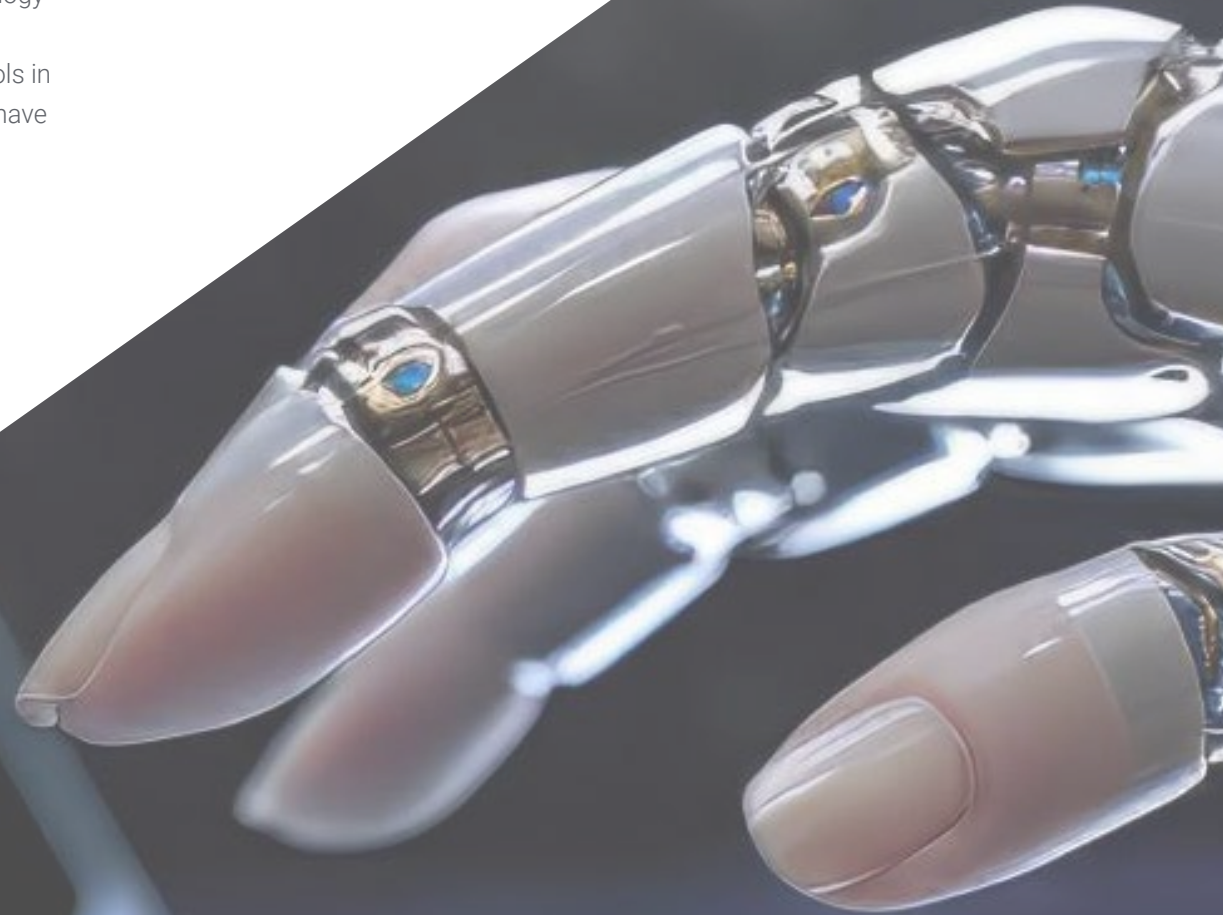
*Give a quality boost to your career as a physician by incorporating the latest trends in Big Data and Predictive Analytics in Medical Imaging into your practice. Enroll now!"*

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.

“

*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.*





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

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.



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.



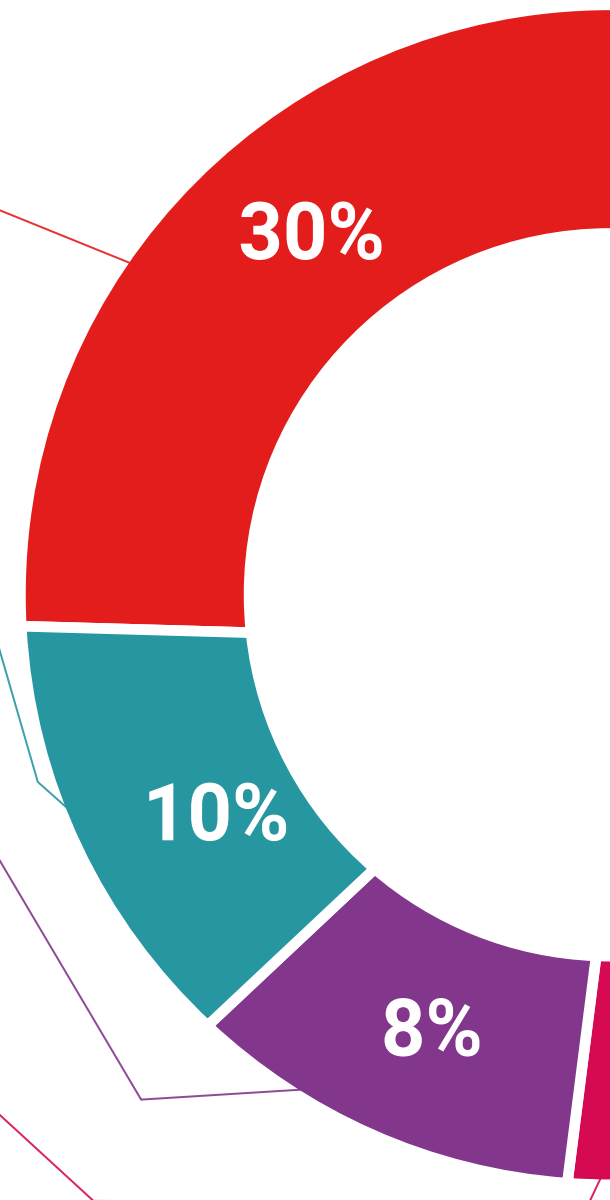
### Practising Skills and Abilities

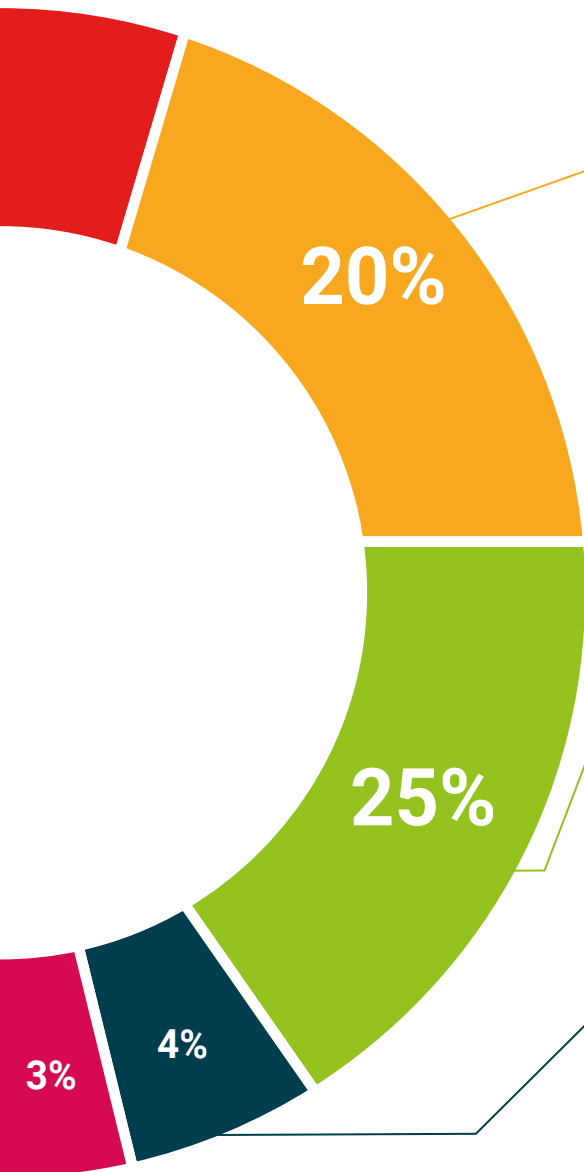
They will carry out activities to develop specific skills and abilities in each subject area. Exercises and activities to acquire and develop the skills and abilities that a specialist needs to develop in the context of the globalization that we are experiencing.



### 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 Big Data and Predictive Analytics in Medical Imaging guarantees students, in addition to the most rigorous and up-to-date education, access to a Postgraduate Certificate issued by TECH Global University.



The image features two black graduation caps (mortarboards) against a bright blue sky with light, wispy clouds. One cap is in the foreground on the left, held by a hand, and the other is slightly behind it on the right. The background is split diagonally by a white and blue geometric shape.

“

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

This private qualification will allow you to obtain a **Postgraduate Certificate in Big Data and Predictive Analytics in Medical Imaging** 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.

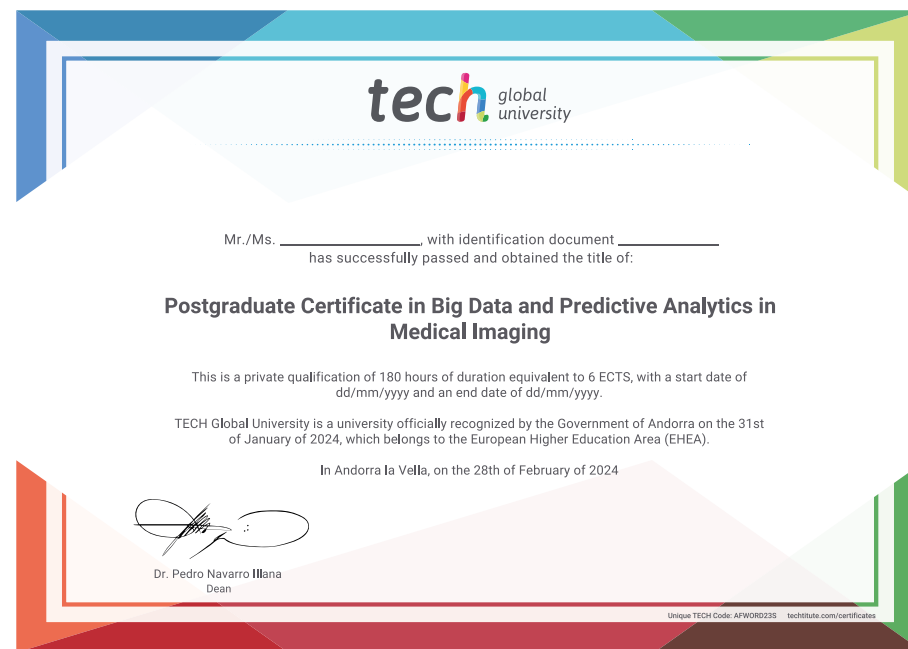
This **TECH Global University** private qualification, is a European program of continuing education and professional updating that guarantees the acquisition of competencies in its area of knowledge, providing a high curricular value to the student who completes the program.

Title: **Postgraduate Certificate in Big Data and Predictive Analytics in Medical Imaging**

Modality: **online**

Duration: **6 weeks**

Accreditation: **6 ECTS**





## Postgraduate Certificate Big Data and Predictive Analytics in Medical Imaging

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