Postgraduate Diploma

Clinical Data Analysis and
Treatment Personalization
through Artificial Intelligence

tech global
university

Postgraduate Diploma

Clinical Data Analysis and Treatment Personalization through Artificial Intelligence

- » Modality: **online**
- » Duration: **6 months.**
- » Certificate: **TECH Global University**
- » Accreditation: **18 ECTS**
- » Schedule: **at your own pace**
- » Exams: **online**

Website: **www.techtitute.com/us/medicine/postgraduate-diploma/postgraduate-diploma-clinical-data-analysis-treatment-personalization-artificial-intelligence**

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01
Introduction

Artificial Intelligence (AI)-assisted surgical robotics is undergoing significant advances, transforming the way surgeries are performed. These advances translate into clinical procedures that are more precise, less invasive and lead to faster recovery for patients. One example is cardiac surgery, where robots can help in areas such as valve repair. In the face of these constant medical innovations, it is essential for professionals to keep their skills up to date in order to implement the most disruptive methods of healthcare. For this reason, TECH has developed a pioneering program 100% online that focuses on the latest trends in healthcare personalization with AI.

You'll delve into the implementation of Big Data and machine learning techniques in Clinical Research thanks to this Postgraduate Diploma"

The fundamentals of Big Data are elementary to harness the potential of information and data in the field of healthcare. Among its main applications to Medicine, the analysis of large amounts of clinical evidence stands out. For example, laboratory test results or genomic data. In this way, physicians can use these resources to diagnose diseases more accurately and predict the course of pathologies. In this way, physicians ensure more efficient treatment for their patients, as it is more tailored to individuals according to their personal needs. In addition, this massive data helps to identify outbreaks in epidemics before they spread, which implies a faster response by health authorities.

In this context, TECH implements an advanced program that will delve into the processing and analysis of text in health data. Under an eminently practical approach, the syllabus covers the advantages of AI in the health field. Therefore, the syllabus describes the most advanced methods for data retrieval, in order to subsequently carry out quality and security evaluations of the stored information. The specialization also delves into the main support systems for graduates to make clinical decisions through intelligent automation. Related to this, the specialization materials provide a holistic view of innovations in the field of surgical robotics, including the Da Vinci System.

In turn, the methodology implemented in this program reinforces its innovative character. TECH offers a 100% online educational environment, adapted to the needs of working professionals seeking to boost their skills. It also employs the Relearning teaching system, 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. In addition, students will have access to a rich library of multimedia resources in different audiovisual formats such as interactive summaries and infographics.

This **Postgraduate Diploma in Clinical Data Analysis and Treatment Personalization through Artificial Intelligence** 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 Artificial Intelligence in Clinical Internship
- 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 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

After this university program, you will be able to integrate Artificial Intelligence tools into in the Electronic Health Records to detect pathologies early and efficiently"

Through this academic pathway, you will delve into the importance of Ethics during the development of Artificial Intelligence medical systems"

You will comprehensively analyze the essential predictive models for personalized clinical practice thanks to this exclusive program.

The Relearning methodology used in this university diploma will allow you to acquire skills in an autonomous and progressive way. At your own speed!.

The program's teaching staff includes professionals from the sector who contribute their work experience to this specializing 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.

02
Objectives

This Postgraduate Diploma will allow doctors to master the emerging trends in Artificial Intelligence applied to personalized health. In this way, graduates will drive medical treatments ranging from genomic analysis to pain management. In addition, they will acquire solid knowledge about obtaining, filtering and preprocessing medical data. Therefore, clinicians will develop a clinical approach that will be distinguished by its integrity in the management of personal data. They will also apply essential ethical principles to their work practice and comply with legal regulations in the implementation of intelligent robotics in medicine.

Take advantage of this opportunity and take the step to get up to speed on the latest trends in data retrieval applied to the healthcare field"

General Objectives

- Understand the theoretical foundations of Artificial Intelligence.
- Study the different types of data and understand the data lifecycle
- 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
- Analyze bio-inspired computing and its relevance in the development of intelligent systems
- Analyze current strategies of Artificial Intelligence in various fields, identifying opportunities and challenges
- Critically evaluate the benefits and limitations of AI in healthcare, identifying potential pitfalls and providing an informed assessment of its clinical application
- Recognize the importance of collaboration across disciplines to develop effective AI solutions
- Gain a comprehensive perspective of emerging trends and technological innovations in AI applied to healthcare
- Acquire solid knowledge in medical data acquisition, filtering, and preprocessing
- Understand the ethical principles and legal regulations applicable to the implementation of AI in medicine, promoting ethical practices, fairness, and transparency

Specific Objectives

Module 1. Personalization of Healthcare through AI

- Delve into emerging trends in AI applied to personalized health and its future impact
- Define AI applications for customizing medical treatments, ranging from genomic analysis to pain management
- Differentiate specific AI algorithms for the development of applications related to drug design or surgical robotics
- Delimit emerging trends in AI applied to personalized health and its future impact
- Promote innovation by developing strategies to improve health care

Module 2. Analysis of *Big Data* in the health sector with AI

- Acquire a solid understanding of medical data collection, filtering, and preprocessing
- Develop a clinical approach based on data quality and integrity in the context of privacy regulations
- Apply the acquired knowledge in use cases and practical applications, enabling to understand and solve industry-specific challenges, from text analytics to data visualization and medical information security
- Define *Big Data* techniques specific to the healthcare sector, including the application of machine learning algorithms for analytics
- Employ *Big Data* procedures to track and monitor the spread of infectious diseases in real time for effective response to epidemics

Module 3. Ethics and Regulation in Medical AI

- Understand the fundamental ethical principles and legal regulations applicable to the implementation of AI in medicine
- Master the principles of data governance
- Understand international and local regulatory frameworks
- Ensuring regulatory compliance in the use of AI data and tools in the healthcare sector
- Develop skills to design human-centered AI systems, promoting equity and transparency in machine learning

You will be able to access the Virtual Campus of this program at any time and download the contents to consult them whenever you want"

03
Course Management

TECH's philosophy is the development of advanced and quality content. To this end, it integrates distinguished professionals with extensive experience in their sector into its qualifications. In this sense, students have at their disposal an advanced syllabus, developed by real experts in Artificial Intelligence in Clinical Research. Their disruptive knowledge in this field is based on a praxis of excellence and the accumulation of the best healthcare results. Acquiring up-to-date knowledge with these specialists is an unparalleled opportunity only available to graduates of this university program.

You will have at your disposal a syllabus designed by a renowned teaching staff, which will guarantee you a successful learning process"

Management

Dr. Peralta Martín-Palomino, Arturo

- CEO and CTO at Prometeus 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

Mr. Martín-Palomino Sahagún, Fernando

- Telecommunications Engineer
- Chief Technology Officer and R+D+i Director at AURA Diagnostics (medTech)
- Business Development at SARLIN
- Chief Operating Officer at Alliance Diagnostics
- Chief Innovation Officer at Alliance Medical
- Chief Information Officer at Alliance Medical
- Field Engineer & Project Management in Digital Radiology at Kodak
- MBA from Polytechnic University of Madrid
- Executive Master in Marketing and Sales at ESADE
- Telecommunications Engineer from the University Alfonso X El Sabio

Professors

Dr. Carrasco González, Ramón Alberto

- Specialist in Computer Science and Artificial Intelligence
- Researcher
- Head of Business Intelligence (Marketing) at the 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.
- Doctor in Artificial Intelligence by the University of Granada
- Higher Engineering Degree in Computer Science from the University of Granada

Mr. Popescu Radu, Daniel Vasile

- Pharmacology, Nutrition and Diet Specialist
- 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 Postgraduate Diploma will comprehensively address the impact of Artificial Intelligence on personalized medical care. To this end, the syllabus will cover the application of genomic-assisted analysis, delving into the interpretation of generic data to design specific therapeutic strategies. Likewise, the syllabus will offer students pioneering techniques to extract information from users that are currently implemented in the health sector. At the same time, they will master fundamental concepts of data mining and retrieval systems. Ethical aspects such as informed consent will also be included in the syllabus.

"

You will acquire a clinical approach based on data quality and integrity in the context of privacy regulations with this comprehensive study plan"

Module 1. Personalization of Healthcare through AI

1.1.   AI Applications in Genomics for Personalized Medicine with DeepGenomics

　　1.1.1.   Development of AI Algorithms for the Analysis of Genetic Sequences and their Relationship with Diseases

　　1.1.2.   Use of AI in the Identification of Genetic Markers for Personalized Treatments

　　1.1.3.   AI Implementation for Fast and Accurate Interpretation of Genomic Data

　　1.1.4.   AI Tools in the Correlation of Genotypes with Drug Responses

1.2.   AI in Pharmacogenomics and Drug Design using AtomWise

　　1.2.1.   Development of AI Models for Predicting Drug Efficacy and Safety

　　1.2.2.   Use of AI in the Identification of Therapeutic Targets and Drug Design

　　1.2.3.   Application of AI in the Analysis of Gene-Drug Interactions for Treatment Personalization

　　1.2.4.   Implementation of AI Algorithms to Accelerate the Discovery of New Drugs

1.3.   Personalized Monitoring with Smart Devices and AI

　　1.3.1.   Development of Wearables with AI for Continuous Monitoring of Health Indicators

　　1.3.2.   Use of AI in the Interpretation of Data Collected by Smart Devices with FitBit

　　1.3.3.   Implementation of AI-Based Early Warning Systems for Health Conditions

　　1.3.4.   AI Tools for Personalization of Lifestyle and Health Recommendations

1.4.   Clinical Decision Support Systems with AI

　　1.4.1.   Implementation of AI to Assist Physicians in Clinical Decision Making with Oracle Cerner

　　1.4.2.   Development of AI Systems that Provide Recommendations Based on Clinical Data

　　1.4.3.   Use of AI in the Evaluation of Risks and Benefits of Different Therapeutic Options

　　1.4.4.   AI Tools for Real-time Health Data Integration and Analysis

Module 2. Big Data Analysis in the Health Sector with AI

Module 3. Ethics and Regulation in Medical AI

3.1. Ethical Principles in the Use of AI in Medicine.

3.1.1. Analysis and Adoption of Ethical Principles in the Development and Use of Medical AI Systems

3.1.2. Integrating Ethical Values into AI-Assisted Decision-Making in Medical Settings

3.1.3. Establishing Ethical Guidelines to Ensure the Responsible Use of Artificial Intelligence in Medicine

3.2. Data Privacy and Consent in Medical Contexts

3.2.1. Developing Privacy Policies to Protect Sensitive Data in Medical AI Applications

3.2.2. Guarantee of Informed Consent in the Collection and Use of Personal Data in the Medical Field

3.2.3. Implementation of Security Measures to Safeguard Patient Privacy in Medical AI Environments

3.3. Ethics in Research and Development of Medical AI Systems

3.3.1. Ethical Evaluation of Research Protocols in the Development of AI Systems for Health

3.3.2. Ensure Transparency and Ethical Rigor in the Development and Validation of Medical AI Systems

3.3.3. Ethical Considerations in the Publication and Sharing of Medical AI Results

3.4. Social Impact and Accountability in Health AI

3.4.1. Analysis of the Social Impact of AI on Health Service Delivery

3.4.2. Development of Strategies to Mitigate Risks and Ethical Responsibility in Medical AI Applications

3.4.3. Continuous Social Impact Assessment and Adaptation of AI Systems to Positively Contribute to Public Health

3.5. Sustainable Development of AI in the Health Sector

3.5.1. Integration of Sustainable Practices in the Development and Maintenance of AI Systems in Health

3.5.2. Environmental and Economic Impact Assessment of AI Technologies in Health

3.5.3. Development of Sustainable Business Models to Ensure Continuity and Improvement of AI Solutions in the Health Sector

3.6. Data Governance and International Regulatory Frameworks in Medical AI

3.6.1. Development of Governance Frameworks for Ethical and Efficient Data Management in Medical AI Applications

3.6.2. Adaptation to International Regulations to Ensure Ethical and Legal Compliance

3.6.3. Active Participation in International Initiatives to Establish Ethical Standards in the Development of Medical AI Systems

3.7. Economic Aspects of AI in the Health Sector

3.7.1. Analysis of Economic Implications and Cost-Benefits in the Implementation of AI Systems in Health

3.7.2. Development of Business Models and Financing to Facilitate the Adoption of AI Technologies in the Healthcare Sector

3.7.3. Assessment of Economic Efficiency and Equity in Access to AI-Driven Health Services

3.8. Human-Centered Design of Medical AI Systems.

3.8.1. Integration of Human-Centered Design Principles to Improve Usability and Acceptance of Medical AI Systems

3.8.2. Participation of Health Professionals and Patients in the Design Process to Ensure the Relevance and Effectiveness of the Solutions

3.8.3. Continuous User Experience Assessment and Feedback to Optimize Interaction with AI Systems in Medical Environments

3.9. Fairness and Transparency in Medical Machine Learning

3.9.1. Development of Medical Machine Learning Models that Promote Equity and Transparency

3.9.2. Implementation of Practices to Mitigate Biases and Ensure Equity in the Application of AI Algorithms in the Field of Health

3.9.3. Continuous Assessment of Equity and Transparency in the Development and Deployment of Machine Learning Solutions in Medicine

3.10. Safety and Policy in the Implementation of AI in Medicine.

3.10.1. Development Security Policies to Protect Data Integrity and Confidentiality in Medical AI Applications

3.10.2. Implementation of Safety Measures in the Deployment of AI Systems to Prevent Risks and Ensure Patient Safety

3.10.3. Continuous Evaluation of Safety Policies to Adapt to Technological Advances and New Challenges in the Implementation of AI in Medicine

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.

"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 Nursing School we use the Case Method

In a given situation, what should a professional do? 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. Nurses learn better, faster, and more sustainably over time.

With TECH, nurses can experience a learning methodology that is shaking the foundations of traditional universities around the world.
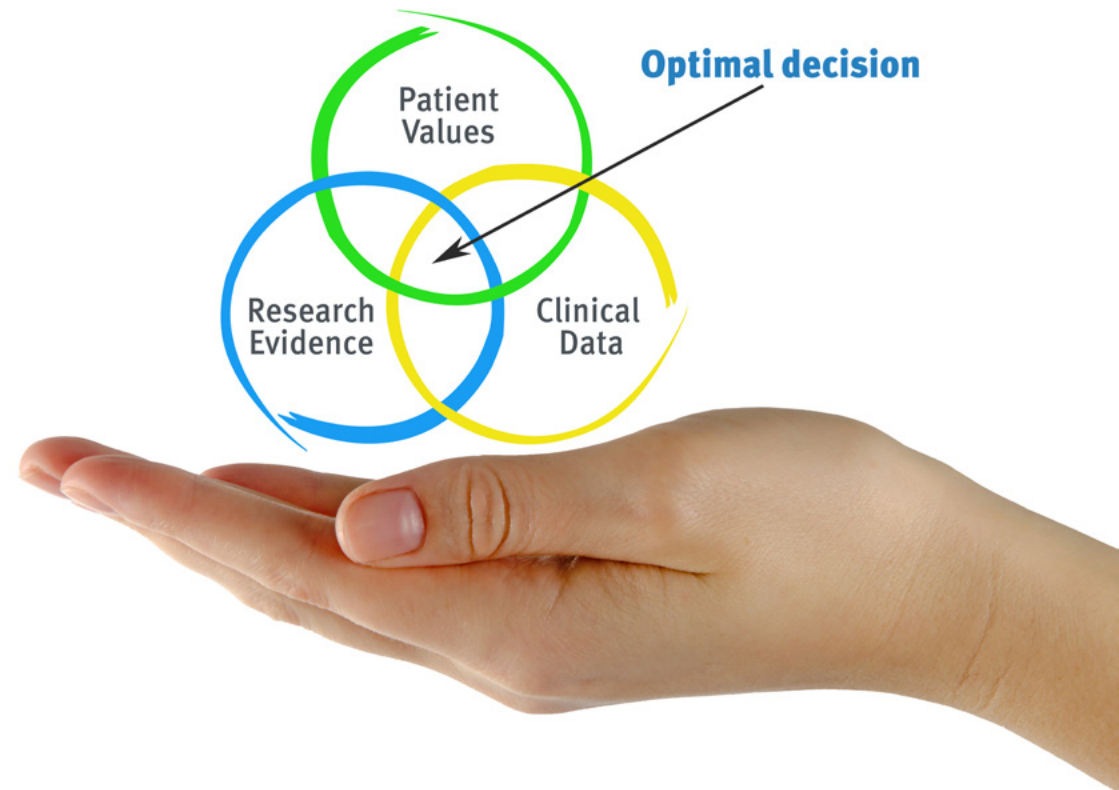
According to Dr. Gérvas, the clinical case is the annotated presentation of a patient, or group of patients, which becomes a "case", an example or model that illustrates some peculiar clinical component, either because of its teaching power or because of its uniqueness or rarity. It is essential that the case is based on current professional life, in an attempt to recreate the real conditions in professional nursing practice.

"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. Nurses who follow this method not only grasp concepts, but also develop their mental capacity, by evaluating real situations and applying their knowledge.

2. The learning process has a clear focus on practical skills that allow the nursing professional to better integrate knowledge acquisition into the hospital setting or primary care.

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 case studies with a 100% online learning system based on repetition combining a minimum of 8 different elements in each lesson, which is a real revolution compared to the simple study and analysis of cases.

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

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)

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 we have trained more than 175,000 nurses with unprecedented success in all specialities regardless of practical workload. 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:
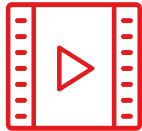
Study Material

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

These contents are then adapted in 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.

Nursing Techniques and Procedures on Video

We introduce you to the latest techniques, to the latest educational advances, 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 them as many times as you want.

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.

20%

15%

15%

3%

20%

17%

7%

3%
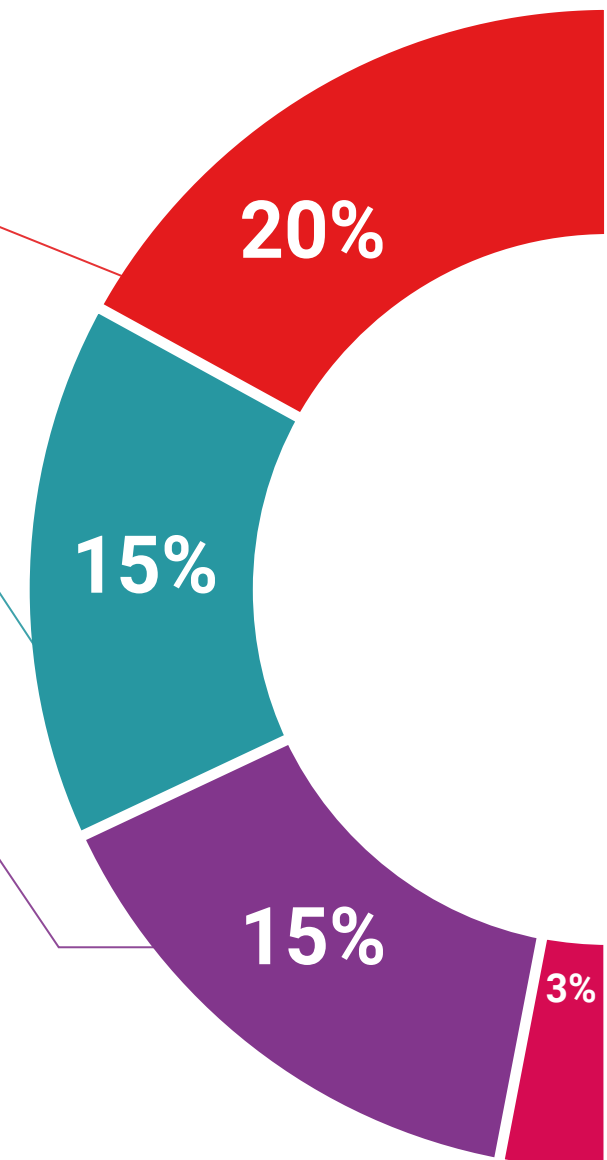
Expert-Led Case Studies and Case Analysis

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.
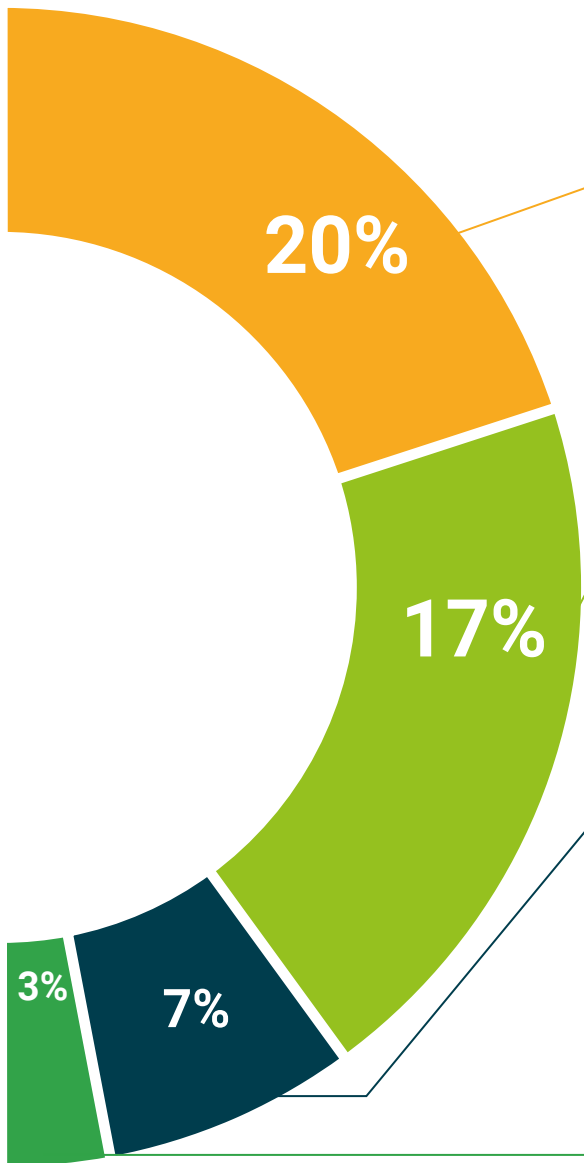
Testing & Retesting

The student's knowledge is periodically assessed and re-assessed throughout the program, through evaluative and self-evaluative activities and exercises: in this way, students can check how they are doing in terms of achieving their goals.

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.

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.

Certificate

The Postgraduate Diploma in Clinical Data Analysis and Treatment Personalization through Artificial Intelligence guarantees students, in addition to the most rigorous and up-to-date education, access to a Postgraduate Certificate issued by TECH Global University.

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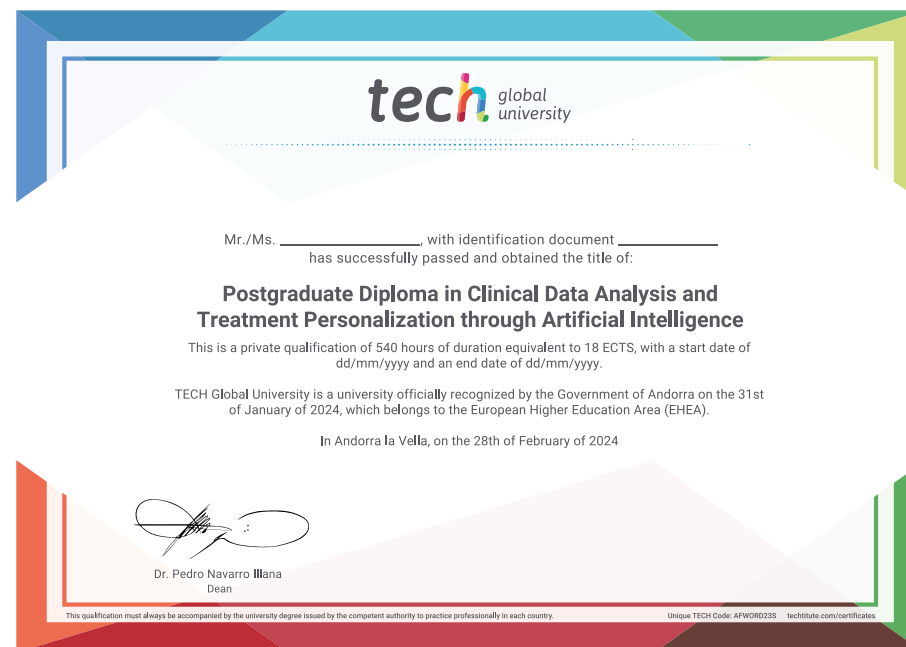
This **TECH Global University** private qualification is a European program of continuing education and professional updating that guarantees the acquisition of competencies in its area of knowledge, providing a high curricular value to the student who completes the program.

Title: **Postgraduate Diploma in Clinical Data Analysis and Treatment Personalization through Artificial Intelligence**

Modality: **online**

Duration: **6 months**

Accreditation: **18 ECTS**

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tech global university

Mr./Ms. _____, with identification document _____
has successfully passed and obtained the title of:

Postgraduate Diploma in Clinical Data Analysis and Treatment Personalization through Artificial Intelligence

This is a private qualification of 540 hours of duration equivalent to 18 ECTS, with a start date of dd/mm/yyyy and an end date of dd/mm/yyyy.

TECH Global University is a university officially recognized by the Government of Andorra on the 31st of January of 2024, which belongs to the European Higher Education Area (EHEA).

In Andorra la Vella, on the 28th of February of 2024

Dr. Pedro Navarro Illana
Dean

This qualification must always be accompanied by the university degree issued by the competent authority to practice professionally in each country. Unique TECH Code: AFWORD23S techtitute.com/certificates

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*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.

tech global university

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Postgraduate Diploma

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