

# Postgraduate Certificate Artificial Intelligence-Enhanced Clinical Diagnostics



## Postgraduate Certificate Artificial Intelligence-Enhanced Clinical Diagnostics

- » 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/artificial-intelligence-enhanced-clinical-diagnostics](http://www.techtitute.com/us/artificial-intelligence/postgraduate-certificate/artificial-intelligence-enhanced-clinical-diagnostics)

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# 01

# Introduction

The application of Machine Learning for pattern recognition in clinical data is a valuable tool in healthcare. These techniques make it possible to analyze large data sets to identify patterns, trends and relationships that may be difficult to detect with traditional methods. For example, algorithms scan MRI or CT images to aid in the prognosis of pathologies such as bone fractures. Likewise, such mechanisms are used to predict risks including heart attacks, cardiovascular accidents and diabetes. However, the application of these procedures involves several challenges that experts must address to ensure their effectiveness. To help them with this, TECH is developing an online learning on pattern identification in clinical diagnostics.





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*A 100% online university program that will allow you to delve into the most disruptive diagnostic functions of Machine Learning tools”*

Artificial Intelligence (AI)-enhanced Clinical Diagnostics has gained importance in the field of medicine in recent years. One of the main reasons is that this system improves accuracy and reduces assessment errors. In this sense, intelligent algorithms process information quickly, which is important in emergency situations. Artificial Intelligence is also useful for recommending personalized treatments based on patients' genetic, historical or clinical data. Undoubtedly, this improves the effectiveness of therapies while reducing adverse reactions.

For this reason, TECH implements a Postgraduate Diploma that will provide specialists with the most modern technologies for Artificial Intelligence-assisted diagnosis. The curriculum will delve into the use of algorithms for rapid and accurate analysis of symptoms. The curriculum will delve into the use of algorithms for rapid and accurate analysis of symptoms. This will enable medical personnel to detect diseases early through resources such as clinical images. In addition, the syllabus will delve into methods for validating and testing Machine Learning models in real healthcare environments. It should be noted that the didactic materials will emphasize the importance of ethics and reliability during clinical practice, thus ensuring the safety of the people being treated. At the end of the academic itinerary, graduates will have acquired new skills that will enrich their health care.

The 100% online mode of this program will give specialists total freedom to take it wherever and whenever they want, without the restriction of schedules. It will be as easy and convenient as connecting through an electronic device with Internet access. In this way, they will have access to multimedia content at the forefront of technology and education, and will benefit from a pioneering learning methodology in TECH. This is *Relearning*, consisting of the repetition of key concepts, ensuring optimal assimilation of content.

The **Postgraduate Certificate in Artificial Intelligence-Enhanced Clinical Diagnostics** 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 in Clinical Practice
- 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 design Datasets that will help you to discover risk factors and develop new therapeutic treatments through this program"*

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*Do you want to specialize in the interpretation of medical images through Intelligent Automation? Achieve it through this exclusive 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 academic year. For this purpose, the students will be assisted by an innovative interactive video system created by renowned and experienced experts.

*You will process natural language on medical records to make the most accurate clinical diagnoses in only 6 months thanks to TECH.*

*A curriculum tailored to your needs and designed under the most effective teaching methodology: Relearning.*



# 02 Objectives

Through this university program, physicians will acquire cutting-edge skills to implement the most advanced Artificial Intelligence techniques in their healthcare practice. Therefore, graduates will be prepared to perform assisted diagnoses, analysis of clinical images and interpretation of model results. Along these lines, professionals will recognize the importance of multidisciplinary collaboration and promote a comprehensive understanding of how different healthcare areas contribute to applying personalized therapies to optimize user care.







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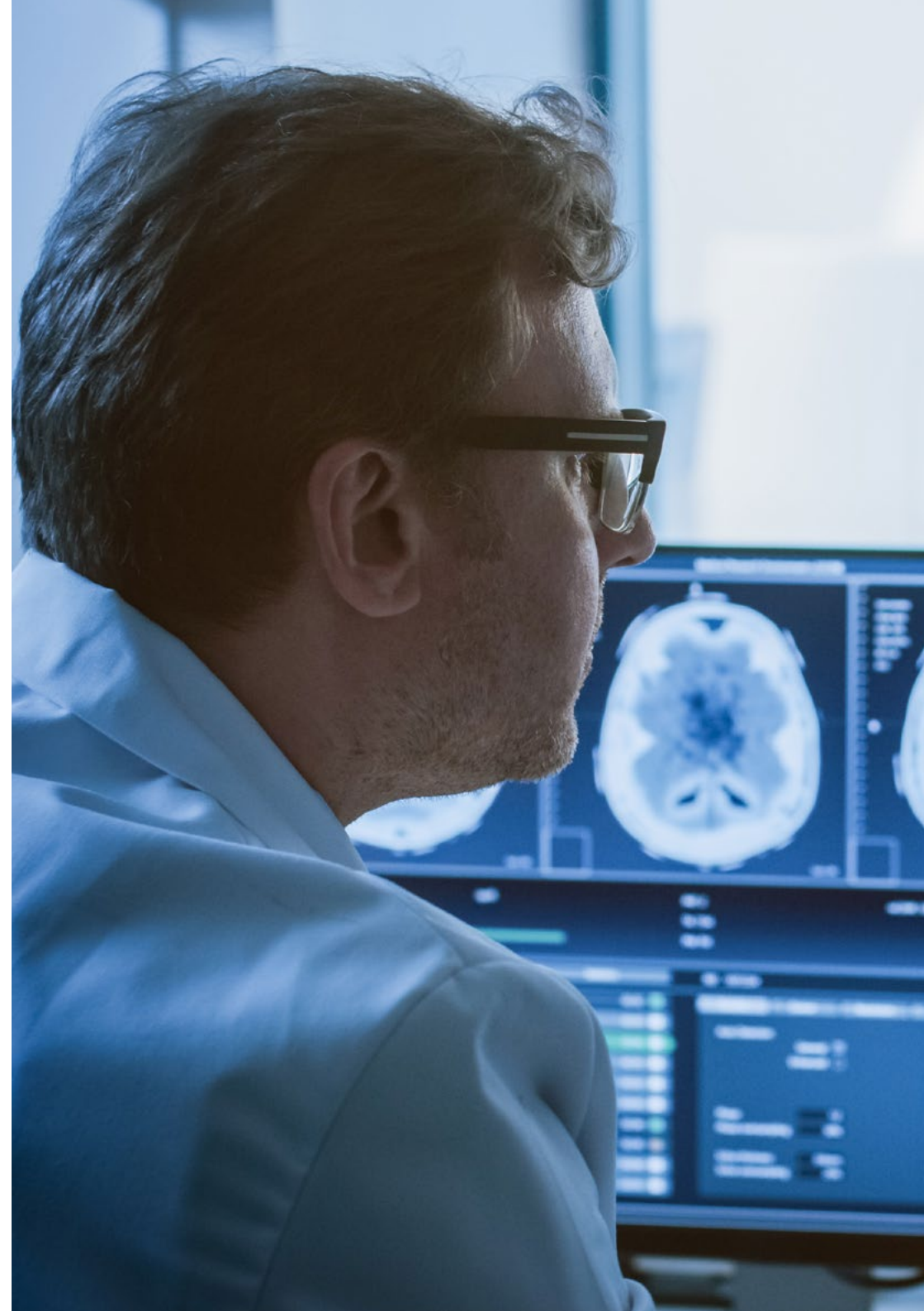
*You will learn valuable lessons through real cases in simulated learning environments”*



## General Objectives

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- ♦ 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 on 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

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- Critically analyze the benefits and limitations of AI in health care
- Identify potential pitfalls, providing an informed assessment of its application in clinical settings
- Recognize the importance of collaboration across disciplines to develop effective AI solutions
- Develop competencies to apply AI tools in the clinical setting, focusing on aspects such as assisted diagnosis, medical image analysis and interpretation of results
- Identify potential pitfalls in the application of AI in healthcare, providing an informed view of its use in clinical settings



*This is a flexible university qualification that is compatible with the most demanding daily responsibilities”*

# 03

# Course Management

This Postgraduate Certificate has been designed by an excellent teaching staff, composed of renowned experts in Artificial Intelligence-Enhanced Clinical Diagnosis. Their extensive professional experience and extensive knowledge in this field makes them a safe bet for students to be updated according to the demands of today's clinical practice through Machine Learning. In this way, graduates will have at their disposal the best tools to develop their skills to the maximum, with the guarantee of quality that TECH offers to obtain optimal academic results.



A hand is shown pointing at a laptop screen. The screen displays a technical diagram or image of a mechanical part. The background is a blue gradient with a white diagonal line.

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*You will have access to a curriculum designed by a reputable teaching staff, which will guarantee you a successful learning"*

## 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



### Mr. Martín-Palomino Sahagún, Fernando

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

## 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
- ♦ PhD in Artificial Intelligence, University of Granada
- ♦ Computer Engineer from the University of Granada

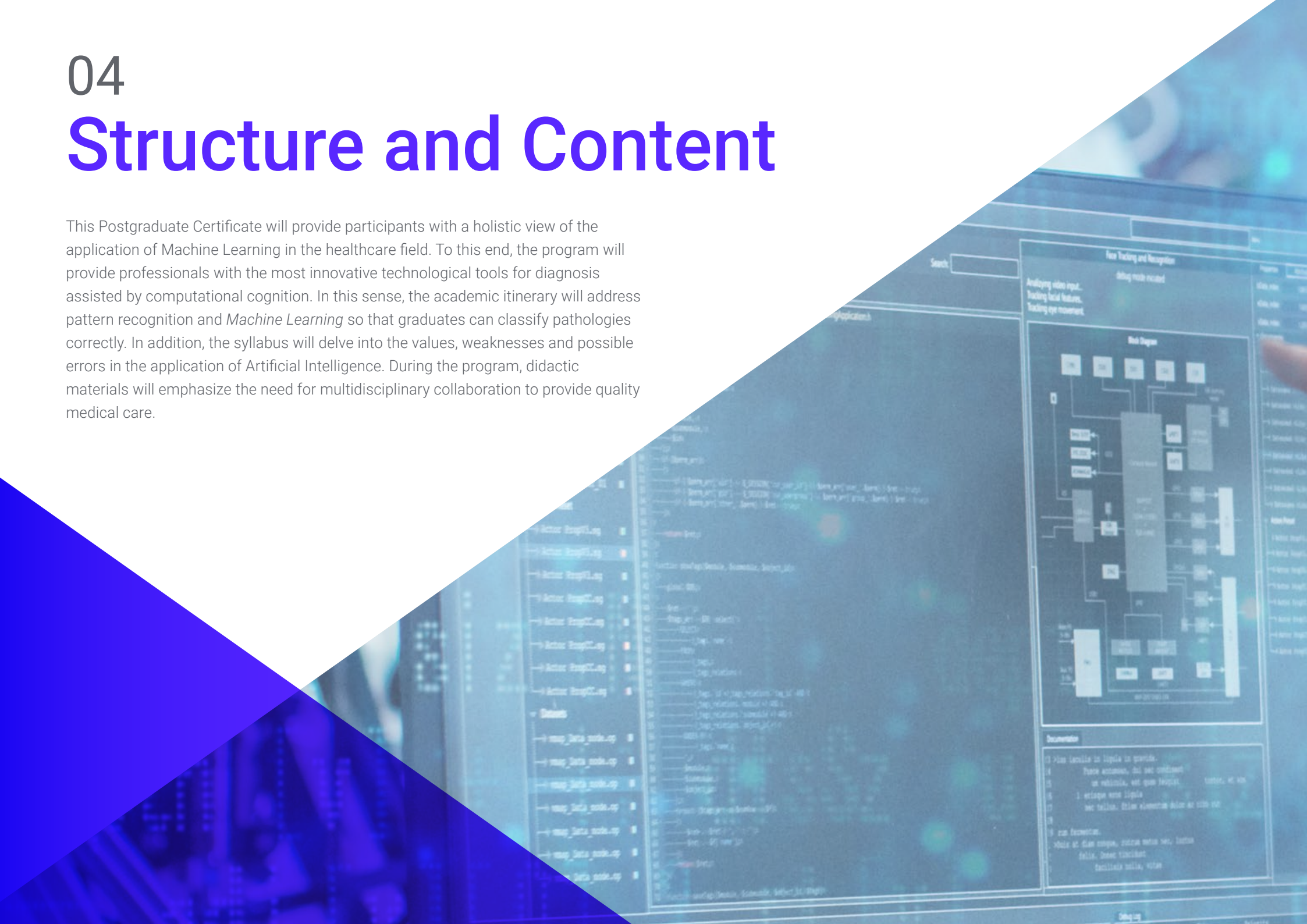
### Mr. Popescu Radu, Daniel Vasile

- ♦ 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

# 04

# Structure and Content

This Postgraduate Certificate will provide participants with a holistic view of the application of Machine Learning in the healthcare field. To this end, the program will provide professionals with the most innovative technological tools for diagnosis assisted by computational cognition. In this sense, the academic itinerary will address pattern recognition and *Machine Learning* so that graduates can classify pathologies correctly. In addition, the syllabus will delve into the values, weaknesses and possible errors in the application of Artificial Intelligence. During the program, didactic materials will emphasize the need for multidisciplinary collaboration to provide quality medical care.





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*Interactive summaries of each topic will allow you to consolidate in a more dynamic way the concepts on the application of NLP in symptom identification”*

## Module 1. Diagnosis in Clinical Practice Using AI

- 1.1. Technologies and Tools for AI-assisted Diagnosis
  - 1.1.1. Development of Software for AI-assisted Diagnosis in Various Medical Specialties
  - 1.1.2. Use of Advanced Algorithms for Rapid and Accurate Analysis of Clinical Symptoms and Signs
  - 1.1.3. Integration of AI in Diagnostic Devices to Improve Efficiency
  - 1.1.4. AI Tools to Assist in the Interpretation of Laboratory Test Results
- 1.2. Integration of Multimodal Clinical Data for Diagnosis
  - 1.2.1. AI Systems for Combining Imaging, Laboratory, and Clinical Record Data
  - 1.2.2. Tools for Correlating Multimodality Data into More Accurate Diagnoses
  - 1.2.3. Use of AI to Analyze Complex Patterns from Different Types of Clinical Data
  - 1.2.4. Integration of Genomic and Molecular Data in AI-assisted Diagnosis
- 1.3. Creation and Analysis of Health *Datasets* with AI
  - 1.3.1. Development of Clinical Databases for Training AI Models
  - 1.3.2. Use of AI for Analysis and Extraction of *Insights* from Large Health *Datasets*
  - 1.3.3. AI Tools for Clinical Data Cleaning and Preparation
  - 1.3.4. AI Systems for Identifying Trends and Patterns in Health Data
- 1.4. Visualization and Management of Health Data with AI
  - 1.4.1. AI Tools for Interactive and Understandable Visualization of Health Data
  - 1.4.2. AI Systems for Efficient Management of Large Volumes of Clinical Data
  - 1.4.3. Use of AI-based *Dashboards* for Monitoring of Health Indicators
  - 1.4.4. AI Technologies for Health Data Management and Security
- 1.5. Pattern Recognition and *Machine Learning* in Clinical Diagnostics
  - 1.5.1. Application of *Machine Learning* Techniques for Pattern Recognition in Clinical Data
  - 1.5.2. Use of AI in the Early Identification of Diseases through Pattern Analysis
  - 1.5.3. Development of Predictive Models for More Accurate Diagnoses
  - 1.5.4. Implementation of Automatic Learning Algorithms in the Interpretation of Health Data



- 1.6. Interpretation of Medical Images Using AI
  - 1.6.1. AI Systems for Anomaly Detection and Classification of Medical Image Anomalies
  - 1.6.2. Use of Deep Learning in the interpretation of X-rays, MRI and CT scans.
  - 1.6.3. AI Tools for Improving Accuracy and Speed in Diagnostic Imaging
  - 1.6.4. Implementation of AI for Image-Based Clinical Decision-Making Assistance
- 1.7. Natural Language Processing on Medical Records for Clinical Diagnosis
  - 1.7.1. Use of NLP for the Extraction of Relevant Information from Medical Records
  - 1.7.2. AI Systems for Analyzing Physician Notes and Patient Reports
  - 1.7.3. AI Tools for Summarizing and Classifying Information from Medical Records
  - 1.7.4. Application of NLP in Identifying Symptoms and Diagnoses from Clinical Texts
- 1.8. Validation and Evaluation of AI-assisted Diagnostic Models
  - 1.8.1. Methods for Validation and Testing of AI Models in Real Clinical Environments
  - 1.8.2. Evaluation of the Performance and Accuracy of AI-assisted Diagnostic Tools
  - 1.8.3. Use of AI to Ensure Reliability and Ethics in Clinical Diagnosis
  - 1.8.4. Implementation of Continuous Assessment Protocols for AI Systems in Health Care
- 1.9. AI in the Diagnosis of Rare Diseases
  - 1.9.1. Development of AI Systems Specializing in the Identification of Rare Diseases
  - 1.9.2. Use of AI to Analyze Atypical Patterns and Complex Symptomatology
  - 1.9.3. AI Tools for Early and Accurate Diagnosis of Rare Diseases
  - 1.9.4. Implementation of Global Databases with AI to Improve Diagnosis of Rare Diseases
- 1.10. Success Stories and Challenges in AI Diagnostics Implementation
  - 1.10.1. Analysis of Case Studies Where AI Has Significantly Improved Clinical Diagnosis
  - 1.10.2. Assessment of the Challenges in the Adoption of AI in Clinical Settings
  - 1.10.3. Discussion of Ethical and Practical Barriers in Implementing AI for Diagnosis
  - 1.10.4. Examination of Strategies to Overcome Obstacles in Integrating AI in Medical Diagnostics



*TECH's learning system follows the highest international quality standards"*

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.

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*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.





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 Artificial Intelligence-Enhanced Clinical Diagnostics guarantees students, in addition to the most rigorous and up-to-date education, access to a Postgraduate Certificate issued by TECH Technological University.



The image features two black graduation caps (mortarboards) against a bright blue sky with light, wispy clouds. The caps are positioned diagonally, with one in the foreground and another slightly behind it. The background is split into a blue upper half and a white lower half by a diagonal line. The 'tech' logo in the top right corner has the letters 't', 'e', and 'c' in blue, and 'h' in red.

“

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

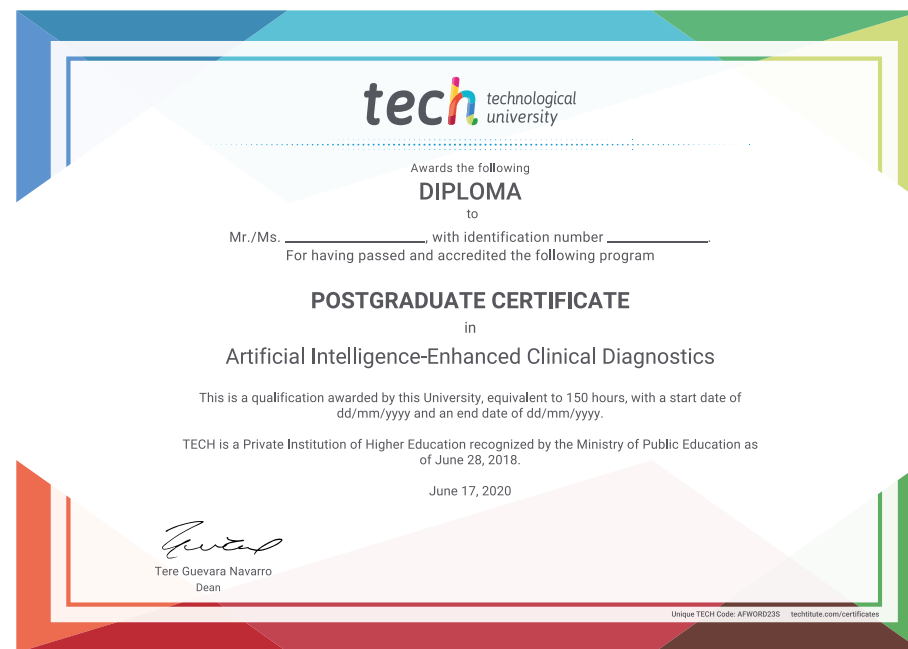
This **Postgraduate Certificate in Artificial Intelligence-Enhanced Clinical Diagnostics** contains the most complete and up-to-date scientific program on the market.

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

The 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 Artificial Intelligence-Enhanced Clinical Diagnostics**

Official N° of hours: **150 h.**



\*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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**Artificial Intelligence-Enhanced**  
**Clinical Diagnostics**

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