

# Postgraduate Certificate

## Advanced Methodologies in Biomedical Research with Artificial Intelligence



## Postgraduate Certificate Advanced Methodologies in Biomedical Research with Artificial Intelligence

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

Website: [www.techtitute.com/in/medicine/postgraduate-certificate/methodologies-biomedical-research-artificial-intelligence](http://www.techtitute.com/in/medicine/postgraduate-certificate/methodologies-biomedical-research-artificial-intelligence)

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# 01

# Introduction

Advanced Biomedical Research Methodologies with Artificial Intelligence (AI) offer a range of crucial benefits in healthcare. Indeed, AI makes it possible to analyze large medical datasets quickly and accurately, identifying complex patterns that might go unnoticed by conventional methods. This facilitates the discovery of new therapies, the design of more effective and personalized drugs, as well as the prediction of diseases before their clinical manifestation. In addition, it speeds up diagnostic processes through the accurate interpretation of medical images, improving patient care and enabling more preventive and precise medicine. That is why TECH has developed this 100% online program, which uses the revolutionary *Relearning* methodology.





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*Enroll now! You will delve into AI's ability to integrate data and predict outcomes, contributing to more accurate and personalized medicine”*

Given the ability of Artificial Intelligence (AI) to employ machine learning models to manage and analyze large amounts of medical data in an agile and accurate way, it has become an extremely useful tool in clinical decision making and image analysis. Among the benefits of using this technology are the early detection and diagnosis of diseases, the reduction of errors and the design of personalized treatment, according to the patient's needs.

In this context, TECH offers physicians this Postgraduate Certificate, which will equip them with the in-depth knowledge and practical skills to become experts in Advanced Methodologies in Biomedical Research with AI. In this way, the graduate will address the application of Artificial Intelligence in the simulation of biological processes and diseases. In addition, they will delve into the generation of synthetic data sets, as well as the scientific and clinical validation of the resulting models.

In addition, molecular interactions and modeling of complex diseases will be analyzed, without forgetting crucial issues such as ethics and regulations associated with the use of synthetic data. Finally, various applications of this technology in the field of health, including drug discovery and treatment simulation, will be explored, offering a comprehensive view of the contribution of AI to clinical research.

Therefore, TECH has conceived a comprehensive program, based on the innovative *Relearning* methodology, with the purpose of qualifying highly competent specialists in Artificial Intelligence. This learning modality focuses on reiterating key concepts to consolidate an optimal understanding. Only an electronic device connected to the Internet will be required to access the contents at any time, eliminating the need for on-site attendance or to adhere to established schedules.

This **Postgraduate Certificate in Advanced Methodologies in Biomedical Research with 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 Advanced Methodologies in Biomedical Research with AI
- ♦ 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 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



*This Postgraduate Certificate in Advanced Methodologies in Biomedical Research with AI will help you update your daily clinical practice"*

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*You will use machine learning algorithms for clinical outcome prediction, biomarker discovery and treatment personalization with this 100% online program”*

The program's teaching staff includes professionals from the sector who contribute their work experience to this 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, the students will be assisted by an innovative interactive video system created by renowned and experienced experts.

*As a specialist, you will be able to use Artificial Intelligence to collect data from medical devices and find more complex conditions.*

*Bet on TECH! You will delve into the use of medical imaging and genomic data, in a holistic approach to understanding the complexity of diseases.*



# 02 Objectives

This program aims to equip graduates with the most innovative tools to understand in depth the potential of Artificial Intelligence in healthcare. With a practical and theoretical approach, this program will seek to empower professionals with fundamental skills in the analysis of complex biomedical data, the implementation of machine learning algorithms and the ethical application of AI in clinical decision making. As such, by embarking on this educational journey, specialists will be prepared to lead the revolution in medical research.





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*This Postgraduate Certificate in Advanced Methodologies in Biomedical Research with AI represents an exceptional opportunity to immerse yourself in the future of medicine and biomedical research"*



## General Objectives

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- ♦ Apply computational models to simulate biological processes and treatment responses, using artificial intelligence to improve understanding of complex biomedical phenomena
- ♦ Gain a solid understanding of model validation and simulations in the biomedical domain, exploring the use of synthetic *datasets* and practical applications of AI in health research

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*You will handle AI tools and techniques applied to Clinical Research, giving you the ability to analyze vast data sets efficiently”*





## Specific Objectives

- Acquire solid knowledge on the validation of models and simulations in the biomedical field, ensuring their accuracy and clinical relevance
- Integrate heterogeneous data using advanced methods to enrich the multidisciplinary analysis in Clinical Research
- Develop deep learning algorithms to improve the interpretation and analysis of biomedical data in clinical trials
- Explore the use of synthetic *datasets* in clinical studies and understand the practical applications of AI in health research
- Understand the crucial role of computational simulation in drug discovery, analysis of molecular interactions, and modeling of complex diseases



# 03

# Course Management

The faculty leading this Postgraduate Certificate are internationally renowned experts who are passionate about merging academic excellence with practical application in the field of healthcare. These highly qualified professionals not only possess a deep theoretical knowledge in AI and its application in biomedical research, but also have an impressive track record in innovative projects that have positively impacted medicine. Their commitment goes beyond conventional teaching, as their approach involves motivating graduates to develop revolutionary solutions.





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*Become a leader in Biomedical Research with AI through great subject matter experts and access to cutting-edge knowledge"*

## 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. 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

## 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

# 04

## Structure and Content

The program will offer a solid structure and exceptional content, designed to boost the potential of healthcare and technology professionals. In this way, the program will cover key topics such as the execution of observational studies with AI, methods of integration of heterogeneous data, algorithms in biomedical data analysis and the use of virtual reality in clinical studies. In addition, data mining tools applied to Biomedical Research with AI will be studied in depth, preparing graduates to face the challenges inherent to this tool.







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*A syllabus developed by experts that offers you a complete immersion in the field of Biomedical Research with AI. What are you waiting for to enroll?”*

## Module 1. Biomedical Research with AI

- 1.1. Design and Implementation of Observational Studies with AI
  - 1.1.1. Implementation of AI for the Selection and Segmentation of Populations in Studies
  - 1.1.2. Use of Algorithms for Real-Time Monitoring of Observational Study Data
  - 1.1.3. AI Tools for the Identification of Patterns and Correlations in Observational Studies
  - 1.1.4. Automation of the Data Collection and Analysis Process in Observational Studies
- 1.2. Validation and Calibration of Models in Clinical Research
  - 1.2.1. AI Techniques to Ensure the Accuracy and Reliability of Clinical Models
  - 1.2.2. Use of AI in the Calibration of Predictive Models in Clinical Research
  - 1.2.3. Cross-Validation Methods Applied to Clinical Models Using AI
  - 1.2.4. AI Tools for the Evaluation of Generalization of Clinical Models
- 1.3. Methods for Integration of Heterogeneous Data in Clinical Research
  - 1.3.1. AI Techniques for Combining Clinical, Genomic and Environmental Data
  - 1.3.2. Use of Algorithms to Manage and Analyze Unstructured Clinical Data
  - 1.3.3. AI Tools for Normalization and Standardization of Clinical Data
  - 1.3.4. AI Systems for Correlation of Different Types of Data in Research
- 1.4. Multidisciplinary Biomedical Data Integration
  - 1.4.1. AI Systems to Combine Data from Different Biomedical Disciplines
  - 1.4.2. Algorithms for Integrated Analysis of Laboratory and Clinical Data
  - 1.4.3. AI Tools for Visualization of Complex Biomedical Data
  - 1.4.4. Use of AI in the Creation of Holistic Health Models from Multidisciplinary Data
- 1.5. Deep Learning Algorithms in Biomedical Data Analysis
  - 1.5.1. Implementation of Neural Networks in the Analysis of Genetic and Proteomic Data
  - 1.5.2. Use of Deep Learning for Pattern Identification in Biomedical Data
  - 1.5.3. Development of Predictive Models in Precision Medicine with Deep Learning
  - 1.5.4. Application of AI in the Advanced Analysis of Biomedical Images





- 1.6. Optimization of Research Processes with Automation
  - 1.6.1. Automation of Laboratory Routines Using AI Systems
  - 1.6.2. Use of AI for Efficient Management of Resources and Time in Research
  - 1.6.3. AI Tools for Optimization of Workflows in Clinical Research
  - 1.6.4. Automated Systems for Tracking and Reporting Progress in Research
- 1.7. Simulation and Computational Modeling in Medicine with AI
  - 1.7.1. Development of Computational Models to Simulate Clinical Scenarios
  - 1.7.2. Use of AI for the Simulation of Molecular and Cellular Interactions
  - 1.7.3. AI Tools in the Creation of Predictive Models of Disease
  - 1.7.4. Application of AI in the Simulation of Drug and Treatment Effects
- 1.8. Use of Virtual and Augmented Reality in Clinical Studies
  - 1.8.1. Implementation of Virtual Reality for Training and Simulation in Medicine
  - 1.8.2. Use of Augmented Reality in Surgical and Diagnostic Procedures
  - 1.8.3. Virtual Reality Tools for Behavioral and Psychological Studies
  - 1.8.4. Application of Immersive Technologies in Rehabilitation and Therapy
- 1.9. Data Mining Tools Applied to Biomedical Research
  - 1.9.1. Use of Data Mining Techniques to Extract Knowledge from Biomedical Databases
  - 1.9.2. Implementation of AI Algorithms to Discover Patterns in Clinical Data
  - 1.9.3. AI Tools for Trend Identification in Large Data Sets
  - 1.9.4. Application of Data Mining in the Generation of Research Hypotheses
- 1.10. Development and Validation of Biomarkers with Artificial Intelligence
  - 1.10.1. Use of AI for the Identification and Characterization of Novel Biomarkers
  - 1.10.2. Implementation of AI Models for the Validation of Biomarkers in Clinical Studies
  - 1.10.3. AI Tools in the Correlation of Biomarkers with Clinical Outcomes
  - 1.10.4. Application of AI in Biomarker Analysis for Personalized 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.





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

## At TECH we use the Case Method

What should a professional do in a given situation? Throughout the program, students will face multiple simulated clinical cases, based on real patients, in which they will have to do research, establish hypotheses, and ultimately resolve the situation. There is an abundance of scientific evidence on the effectiveness of the method. Specialists learn better, faster, and more sustainably over time.

*With TECH you will experience a way of learning that is shaking the foundations of traditional universities around the world.*



According to Dr. Gérvas, the clinical case is the annotated presentation of a patient, or group of patients, which becomes a "case", an example or model that illustrates some peculiar clinical component, either because of its teaching power or because of its uniqueness or rarity. It is essential that the case is based on current professional life, trying to recreate the real conditions in the physician's professional practice.

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*Did you know that this method was developed in 1912, at Harvard, for law students? The case method consisted of presenting students with real-life, complex situations for them to make decisions and justify their decisions on how to solve them. In 1924, Harvard adopted it as a standard teaching method”*

The effectiveness of the method is justified by four fundamental achievements:

1. Students who follow this method not only achieve the assimilation of concepts, but also a development of their mental capacity, through exercises that evaluate real situations and the application of knowledge.
2. Learning is solidly translated into practical skills that allow the student to better integrate into the real world.
3. Ideas and concepts are understood more efficiently, given that the example situations are based on real-life.
4. Students like to feel that the effort they put into their studies is worthwhile. This then translates into a greater interest in learning and more time dedicated to working on the course.



## Relearning Methodology

At TECH we enhance the case method with the best 100% online teaching methodology available: Relearning.

This university is the first in the world to combine the study of clinical cases with a 100% online learning system based on repetition, combining a minimum of 8 different elements in each lesson, a real revolution with respect to the mere study and analysis of cases.

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





At the forefront of world teaching, the Relearning method has managed to improve the overall satisfaction levels of professionals who complete their studies, with respect to the quality indicators of the best online university (Columbia University).

With this methodology, more than 250,000 physicians have been trained with unprecedented success in all clinical specialties regardless of surgical load. Our pedagogical methodology is developed in a highly competitive environment, with a university student body with a strong socioeconomic profile and an average age of 43.5 years old.

*Relearning will allow you to learn with less effort and better performance, involving you more in your specialization, developing a critical mindset, defending arguments, and contrasting opinions: a direct equation to success.*

In our program, learning is not a linear process, but rather a spiral (learn, unlearn, forget, and re-learn). Therefore, we combine each of these elements concentrically.

The overall score obtained by TECH's learning system is 8.01, according to the highest international standards.



This program offers the best educational material, prepared with professionals in mind:



#### Study Material

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

These contents are then applied to the audiovisual format, to create the TECH online working method. All this, with the latest techniques that offer high quality pieces in each and every one of the materials that are made available to the student.



#### Surgical Techniques and Procedures on Video

TECH introduces students to the latest techniques, the latest educational advances and to the forefront of current medical techniques. All of this in direct contact with students and explained in detail so as to aid their assimilation and understanding. And best of all, you can watch the videos as many times as you like.



#### Interactive Summaries

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

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



#### Additional Reading

Recent articles, consensus documents and international guidelines, among others. In TECH's virtual library, students will have access to everything they need to complete their course.





#### Expert-Led Case Studies and Case Analysis

Effective learning ought to be contextual. Therefore, TECH presents real cases in which the expert will guide students, focusing on and solving the different situations: a clear and direct way to achieve the highest degree of understanding.



#### Testing & Retesting

We periodically evaluate and re-evaluate students' knowledge throughout the program, through assessment and self-assessment activities and exercises, so that they can see how they are achieving their goals.



#### Classes

There is scientific evidence on the usefulness of learning by observing experts. The system known as Learning from an Expert strengthens knowledge and memory, and generates confidence in future difficult decisions.



#### Quick Action Guides

TECH offers the most relevant contents of the course in the form of worksheets or quick action guides. A synthetic, practical, and effective way to help students progress in their learning.



# 06 Certificate

The Postgraduate Certificate in Advanced Methodologies in Biomedical Research with Artificial Intelligence guarantees students, in addition to the most rigorous and up-to-date education, access to a Postgraduate Certificate issued by TECH Technological University.





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

This **Postgraduate Certificate in Advanced Methodologies in Biomedical Research with Artificial Intelligence** contains the most complete and up-to-date scientific 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 certificate 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 Advanced Methodologies in Biomedical Research with Artificial Intelligence**

Official N° of Hours: **150 h.**



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

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guarantee accreditation teaching  
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community commitment  
personalized service innovation  
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development languages  
virtual classroom



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