Postgraduate Certificate

Advanced Methodologies in Biomedical Research with Artificial Intelligence

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Postgraduate Certificate
Advanced Methodologies in Biomedical Research with Artificial Intelligence

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

Website: **www.techtitute.com/us/artificial-intelligence/postgraduate-certificate/advanced-methodologies-biomedical-research-artificial-intelligence**

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Introduction

Advanced Biomedical Research Methodologies with Artificial Intelligence (AI) are transforming the way challenges in Biomedicine are addressed. Such systems allow professionals to analyze and interpret large data sets with greater precision. Among such resources, Deep Learningg stands out: convolutional neural networks are used in medical image processing tasks, genetic sequence studies and clinical text processing. This is effective for both pattern detection and classification of biomedical data. For this reason, TECH is developing a university program that will analyze the design and execution of observational studies with AI. All under a convenient 100% online format, which gives professionals flexibility!

Implement neural networks in the best digital university in the world according to Forbes"

Machine Learning in Biomedical Research is extremely beneficial for clinicians to improve the accuracy of their diagnoses. By analyzing considerable volumes of biomedical data, this system detects individual patterns in users' health. In this way, experts develop fully personalized treatment plans to suit the specific needs of patients. In addition, this technology is able to locate complex relationships between genes, proteins and diseases, facilitating the discovery of biomarkers. This accelerates the research of both new therapies and drugs, which imply an improvement in the well-being of citizens.

In this context, TECH implements a pioneering study that will equip specialists with a comprehensive understanding and the practical skills to become experts in Advanced Methodologies in Biomedical Research with AI. To enable this, the curriculum will delve into the simulation of biological processes and conditions. In this line, the syllabus will delve into the generation of synthetic datasets, as well as the scientific and clinical validation of the resulting models. It should be noted that the academic materials will highlight the importance of ethics and regulations associated with the use of synthetic data.

The syllabus is made more dynamic by multimedia pills and a wide variety of didactic resources such as specialized readings and case studies. In addition, the *Relearning*methodology, used by this academic institution, will help professionals to achieve a much more effective update in less time. A unique opportunity to keep up to date through a flexible online pedagogical option, which favors the compatibility of the most demanding daily responsibilities with a university proposal that is at the forefront. The only requirement for doctors is that they have a device with Internet access to access the Virtual Campus and expand their knowledge through the most innovative didactic content.

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

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

You will overcome contemporary challenges in Biomedical Research, from analyzing large datasets, to predicting clinical outcomes"

You will delve into the use of medical imaging and genomic data, under a holistic approach to understand the complexity of diseases.

You will reinforce your key knowledge through the innovative Relearning methodology for an effective assimilation of the subject.

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

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Objectives

Thanks to this university program, physicians will have at their disposal the most modern tools of Machine Learning to implement it in their medical procedures. Graduates will obtain advanced skills in the analysis of complex biomedical data and the implementation of AI algorithms. In addition, they will be characterized by an ethical approach to clinical decision making. They will also be highly qualified to carry out innovative solutions aimed at improving the quality of life of their patients.

The current importance of biomedical research makes this university program a safe bet, with a market in continuous growth and full of possibilities"

General Objectives

- Apply computational models to simulate biological processes and responses to treatments, using AI to improve understanding of complex biomedical phenomena
- Obtain solid knowledge of model validation and simulations in the biomedical domain, exploring the use of synthetic *datasets* and practical applications of AI in health research

You will master the most advanced Machine Learning tools to analyze large volumes of data 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

In its commitment to offer educational excellence, TECH has a prestigious teaching faculty. These specialists have an extensive work background, having been part of renowned health centers. In addition, they are characterized by a deep knowledge of Advanced Methodologies in Biomedical Research with Artificial Intelligence. They also offer the most modern technological resources in the healthcare market. In this way, the students have the guarantees they need to update their skills and acquire new skills to provide quality service to their patients.

Learn with the best! The diversity of talents and knowledge of the faculty will create a dynamic learning environment"

Management

Dr. Peralta Martín-Palomino, Arturo

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

Mr. Popescu Radu, Daniel Vasile

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

Professors

Dr. Carrasco González, Ramón Alberto

- Computer Science and Artificial Intelligence Specialist
- Researcher
- Head of Business Intelligence (Marketing) at Caja General de Ahorros de Granada and Banco Mare Nostrum
- Head of Information Systems (Data Warehousing and Business Intelligence) at Caja General de Ahorros de Granada and Banco Mare Nostrum
- PhD in Artificial Intelligence, University of Granada
- Computer Engineer from the University of Granada

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Structure and Content

Through an eminently practical approach, this Postgraduate Certificate will provide physicians with advanced AI techniques to apply in Biomedical Research. The curriculum will delve into essential aspects such as the execution of observational studies with Machine Learning, heterogeneous data integration methods, algorithms in biomedical data analysis and the use of Virtual Reality in clinical studies. On the other hand, the agenda will focus on applied Data Mining tools, in order for experts to overcome the challenges inherent to this resource.

This program gives you the opportunity to update your knowledge in a real scenario, with the maximum scientific rigor of an institution at the forefront of technology"

Module 1. Biomedical Research with AI

1.1. Design and Execution 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 for Ensuring 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 the Generalization of Clinical Models

1.3. Methods for Integrating Heterogeneous Data in Clinical Research
- 1.3.1. AI Techniques for Combining Clinical, Genomic, and Environmental Data
- 1.3.2. Use of Algorithms for Handling and Analyzing Unstructured Clinical Data
- 1.3.3. AI Tools for Normalization and Standardization of Clinical Data
- 1.3.4. AI Systems for Correlating Different Types of Research Data

1.4. Integration of Multidisciplinary Biomedical Data
- 1.4.1. AI Systems to Combine Data from Different Biomedical Disciplines
- 1.4.2. Algorithms for the Integrated Analysis of Clinical and of Laboratory Data
- 1.4.3. AI Tools for the 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 Analysis of Genetic and Proteomic Data
- 1.5.2. Using Deep Learning to Identify Patterns in Biomedical Data
- 1.5.3. Development of Predictive Models in Precision Medicine with Deep Learning
- 1.5.4. Application of AI in Advanced Biomedical Image Analysis

1.6. Optimization of Research Processes with Automation
- 1.6.1. Automation of Laboratory Routines with AI Systems
- 1.6.2. Use of AI for Efficient Management of Resources and Time in Research
- 1.6.3. AI Tools for Workflow Optimization in Clinical Research
- 1.6.4. Automated Systems for Tracking and Reporting of Research Progress

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 Simulation of Molecular and Cellular Interactions
- 1.7.3. AI Tools in the Creation of Predictive Disease Models
- 1.7.4. Application of AI in the Simulation of Drug and Treatment Effects

1.8. Use of Virtual and Augmented Reality in Clinical Trials
- 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 Datasets
- 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 New Biomarkers
- 1.10.2. Implementation of AI Models for the Validation of Biomarkers in Clinical Studies
- 1.10.3. AI Tools in Correlating Biomarkers with Clinical Results
- 1.10.4. AI Applications in the analysis of Biomarkers 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.

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

Case Study to contextualize all content

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

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

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

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

A learning method that is different and innovative

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

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

The case method has been the most widely used learning system among the world's leading Information Technology schools for as long as they have existed. The case method was developed in 1912 so that law students would not only learn the law based on theoretical content. It consisted of presenting students with real-life, complex situations for them to make informed decisions and value judgments on how to resolve them. In 1924, Harvard adopted it as a standard teaching method.

What should a professional do in a given situation? This is the question that you are presented with in the case method, an action-oriented learning method. Throughout the course, students will be presented with multiple real cases. They will have to combine all their knowledge and research, and argue and defend their ideas and decisions.

Relearning Methodology

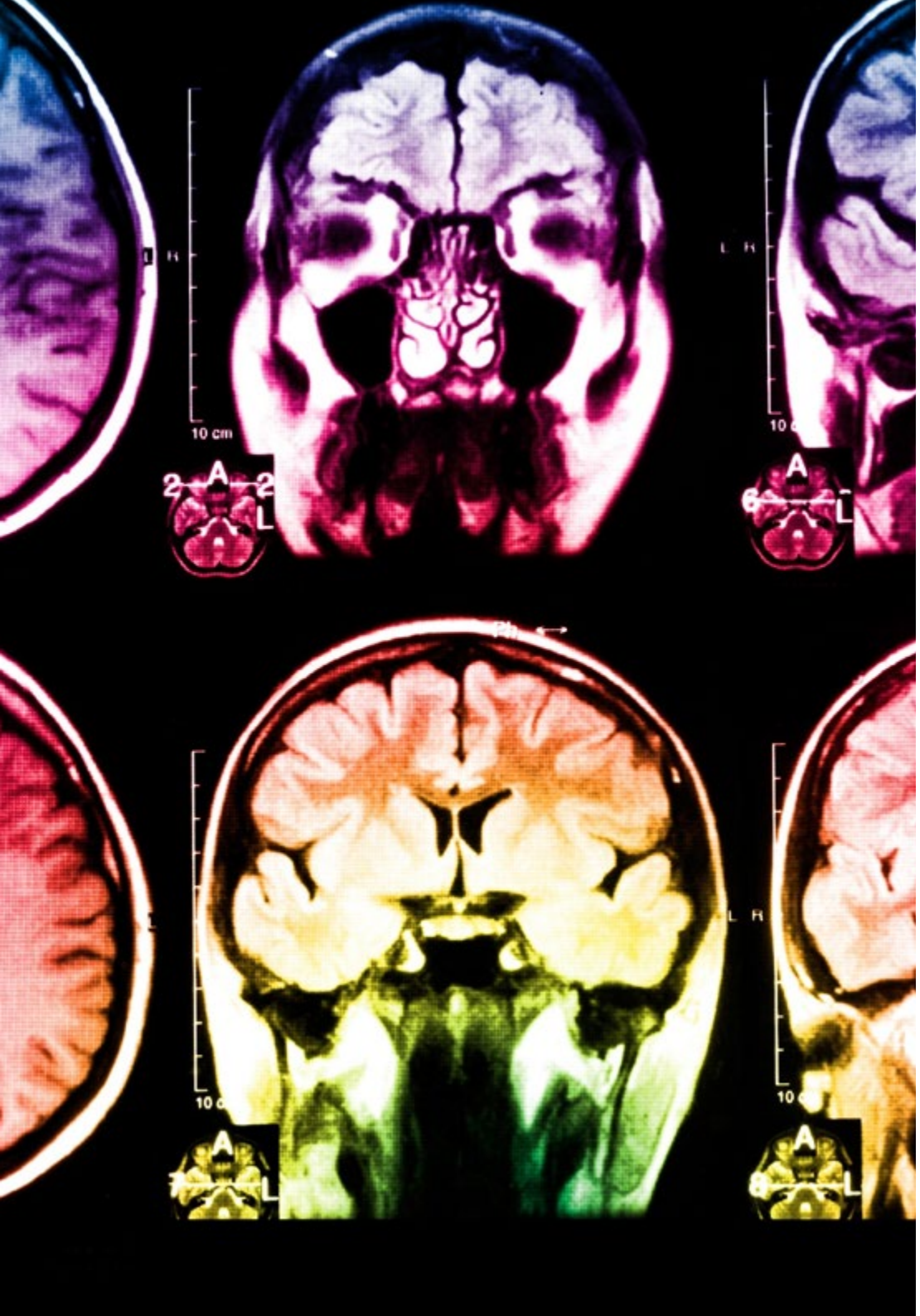
TECH effectively combines the Case Study methodology with a 100% online learning system based on repetition, which combines different teaching elements in each lesson.

We enhance the Case Study with the best 100% online teaching method: Relearning.

In 2019, we obtained the best learning results of all online universities in the world.

At TECH you will learn using a cutting-edge methodology designed to train the executives of the future. This method, at the forefront of international teaching, is called Relearning.

Our university is the only one in the world authorized to employ this successful method. In 2019, we managed to improve our students' overall satisfaction levels (teaching quality, quality of materials, course structure, objectives...) based on the best online university indicators.



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.

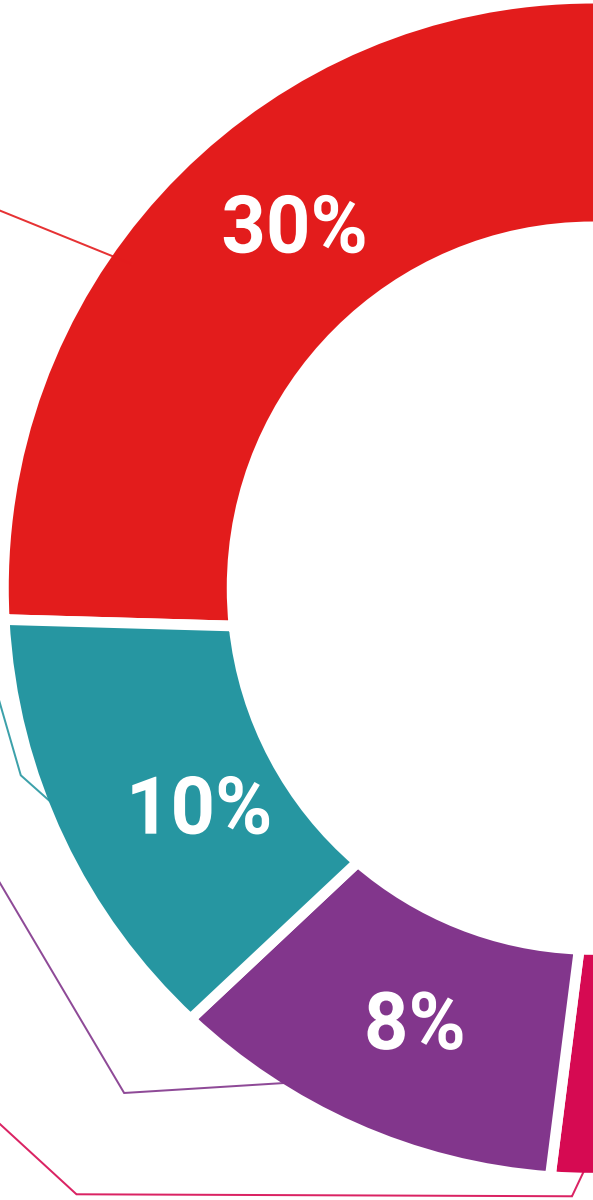
Learning from an Expert strengthens knowledge and memory, and generates confidence in future difficult decisions.

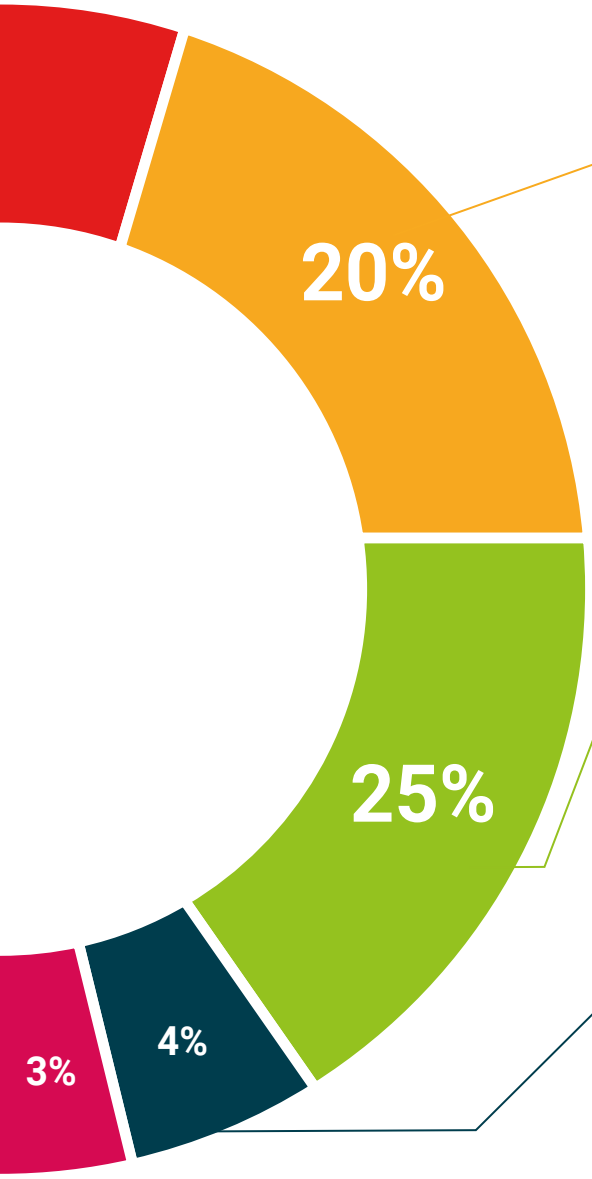
Practising Skills and Abilities

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 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 Global University.

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

This program will allow you to obtain your **Postgraduate Certificate in Advanced Methodologies in Biomedical Research with 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.

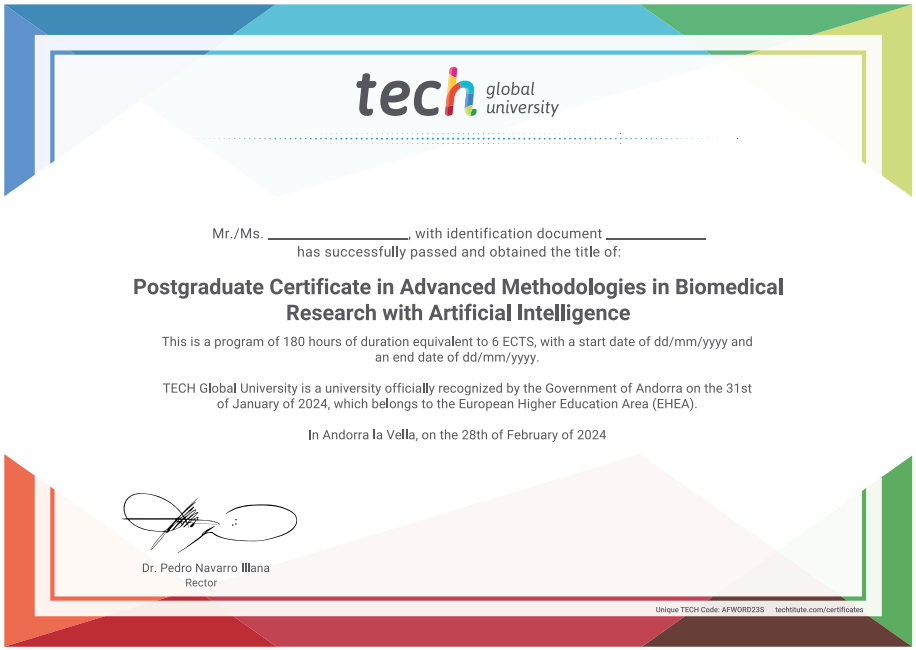
This **TECH Global University** title is a European program of continuing education and professional updating that guarantees the acquisition of competencies in its area of knowledge, providing a high curricular value to the student who completes the program.

Title: **Postgraduate Certificate in Advanced Methodologies in Biomedical Research with Artificial Intelligence**

Modality: **online**

Duration: **6 weeks**

Accreditation: **6 ECTS**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Mr./Ms. _____, with identification document _____
has successfully passed and obtained the title of:

Postgraduate Certificate in Advanced Methodologies in Biomedical Research with Artificial Intelligence

This is a program of 180 hours of duration equivalent to 6 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
Rector

Unique TECH Code: AFWORD23S techtitute.com/certificates

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

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Postgraduate Certificate

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