Postgraduate Certificate

Advanced Methods and Artificial Intelligence Tools for Clinical Research

tech technological university

tech technological university

Postgraduate Certificate
Advanced Methods and Artificial Intelligence Tools for Clinical Research

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

Website: www.techtitute.com/in/artificial-intelligence/postgraduate-certificate/advanced-methods-artificial-intelligence-tools-clinical-research

Index

01

Introduction

The application of Advanced Methods and Artificial Intelligence (AI) tools in Clinical Research has been a transformative catalyst. These technologies enable the efficient analysis of large sets of clinical data, identifying patterns and correlations that could go unnoticed by traditional methods. In addition, Artificial Intelligence facilitates the prediction of clinical outcomes, contributing to more informed and personalized decision making. It also optimizes the process of recruiting participants for clinical trials, speeding up research times. In this context, TECH has developed a comprehensive academic program, which will immerse healthcare professionals in the field of Artificial Intelligence applied to Clinical Research, with the aim of optimizing their approach to healthcare.

The ability of Artificial Intelligence to process data in real time will improve the monitoring of your patients and the early detection of adverse events, promoting the safety and efficacy of your treatments"

Advanced Methods and Artificial Intelligence (AI) tools have emerged as fundamental resources in the field of Clinical Research, bringing innumerable benefits that have revolutionized the research process. In fact, the ability of Artificial Intelligence to process clinical information, quickly and objectively, not only streamlines the research process, but also improves the accuracy in diagnostic and therapeutic decision making.

This Postgraduate Certificate will address both the theoretical foundations and the practical application of Artificial Intelligence, focusing especially on the essential principles of machine learning and its relevance in the analysis of clinical and biomedical data. In this way, physicians will be immersed in the study of various Artificial Intelligence tools and platforms, acquiring detailed knowledge of advanced data visualization techniques, natural language processing in scientific documentation and the application of neural networks in biomedical research. In addition, this comprehensive approach will provide graduates with an updated and complete perspective on the integration of Artificial Intelligence in the healthcare field, preparing them to face contemporary challenges in Clinical Research.

It will also equip professionals with solid theoretical knowledge as well as practical skills, enabling them to effectively apply Artificial Intelligence in Clinical Research projects. Emphasizing the current relevance of the technology, they will be equipped to contribute to the advancement of medical research, leveraging the transformative capabilities of Artificial Intelligence in the understanding and treatment of various pathologies.

Notably, TECH has created a fully online educational environment designed to meet the needs of professionals with busy schedules, but who are looking to advance their careers. In this way, they will be able to individually manage both their schedules and planned evaluations. The training also incorporates the revolutionary Relearning method, which is based on the repetition of key concepts to consolidate knowledge in an optimal way, as well as to facilitate the learning process.

This **Postgraduate Certificate in Advanced Methods and Artificial Intelligence Tools for Clinical Research** 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

The use of Artificial Intelligence in Clinical Research will allow you to analyze large datasets efficiently and accurately, facilitating the identification of complex patterns in medical information"

You will delve into natural language processing applied to scientific documentation, acquiring crucial skills for the extraction and understanding of relevant information in clinical studies"

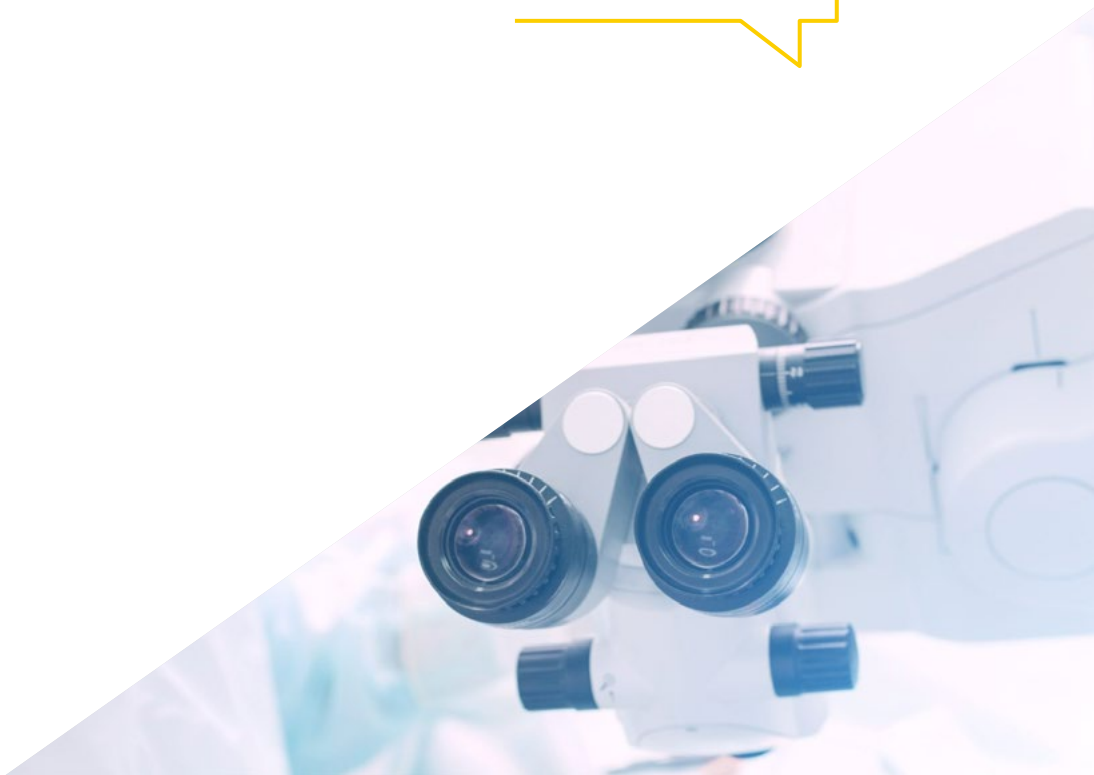
You will implement machine learning algorithms for the personalization of treatments, adapting them to the individual characteristics of patients.

Relearning will enable you to learn with less effort and more performance, involving you more in your professional specialization.

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.



02

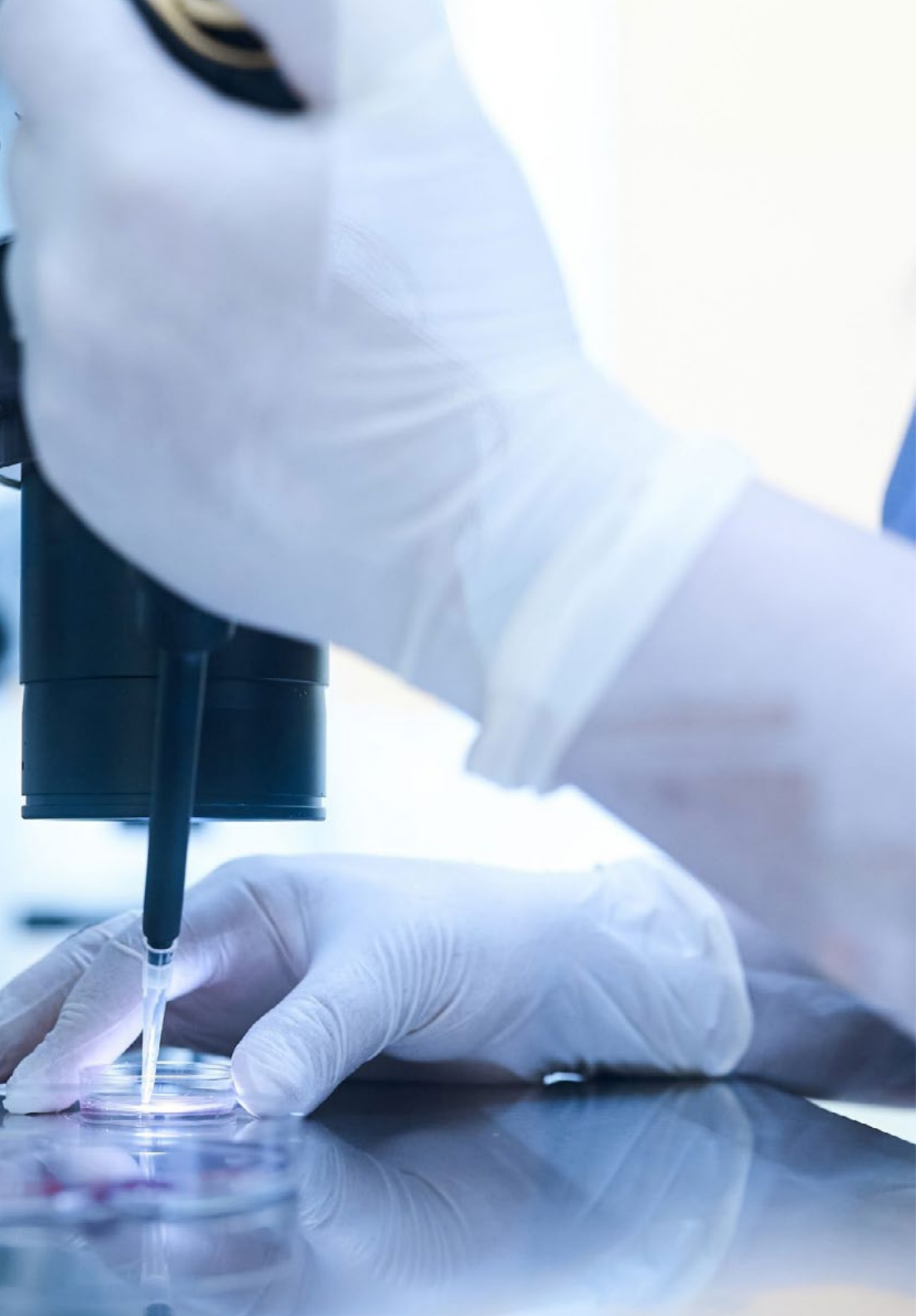
Objectives

This university program will raise the professional horizons of physicians by implementing the most advanced Artificial Intelligence tools in their clinical procedures. Upon completion of the study plan, graduates will have acquired new skills that will improve their medical care. In this way, they will be highly qualified to successfully address the challenges they will face during their various jobs. Likewise, experts will contribute to the advancement of personalized medicine and make the most informed decisions to ensure the well-being of the population.

TECH's priority is to help you acquire academic and professional excellence, so that you can take a leap forward in your career"

General Objectives

- Gain a comprehensive view of the transformation of Clinical Research through Artificial Intelligence, from its historical foundations to current applications
- Acquire practical skills in the use of Artificial Intelligence tools, platforms and techniques, from data analysis to the application of neural networks and predictive modeling
- Learn effective methods for integrating heterogeneous data into Clinical Research, including natural language processing and advanced data visualization
- Obtain solid knowledge of model validation and simulations in the biomedical domain, exploring the use of synthetic *datasets* and practical applications of AI



Specific Objectives

- Gain a comprehensive view of the AI is transforming Clinical Research, from its historical foundations to current applications
- Implement advanced statistical methods and algorithms in clinical studies to optimize data analysis
- Design experiments with innovative approaches and perform comprehensive analysis of results in Clinical Research
- Apply natural language processing to improve scientific and clinical documentation in the Research context
- Effectively integrate heterogeneous data using state-of-the-art techniques to enhance interdisciplinary clinical research

You will extend your knowledge through real cases and resolution of complex situations in simulated learning environments"

03

Course Management

One of the elements that distinguishes this academic proposal is its excellent management and teaching staff. In this Postgraduate Certificate, TECH has brought together an unparalleled team of specialists in this university program. Their extensive clinical experience is combined with their experience in the scientific field. In this way, the graduate will be sure to have access to a syllabus that responds to their needs of updating in Advanced Methods and Tools of Artificial Intelligence in Clinical Research, and from the hand of true professionals.

The teaching staff of this training has a wide trajectory of research and professional application related to Machine Learning in clinical contexts"

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
- Ph.D. in Artificial Intelligence, University of Granada
- Computer Engineer from the University of Granada

04

Structure and Content

Through a dynamic structure, this Postgraduate Certificate will delve into the theoretical principles and practical application of Artificial Intelligence in the clinical setting. The curriculum will address key aspects of Machine Learning, for its subsequent integration in both clinical and biomedical data analysis. In addition, the syllabus will provide graduates with state-of-the-art technological tools, so that they will be equipped with the necessary skills to interpret complex findings. The materials will also include specialized topics in natural language processing applied to scientific documentation.

Expert curriculum and quality content are the key to your learning success"

Module 1. AI Methods and Tools for Clinical Research

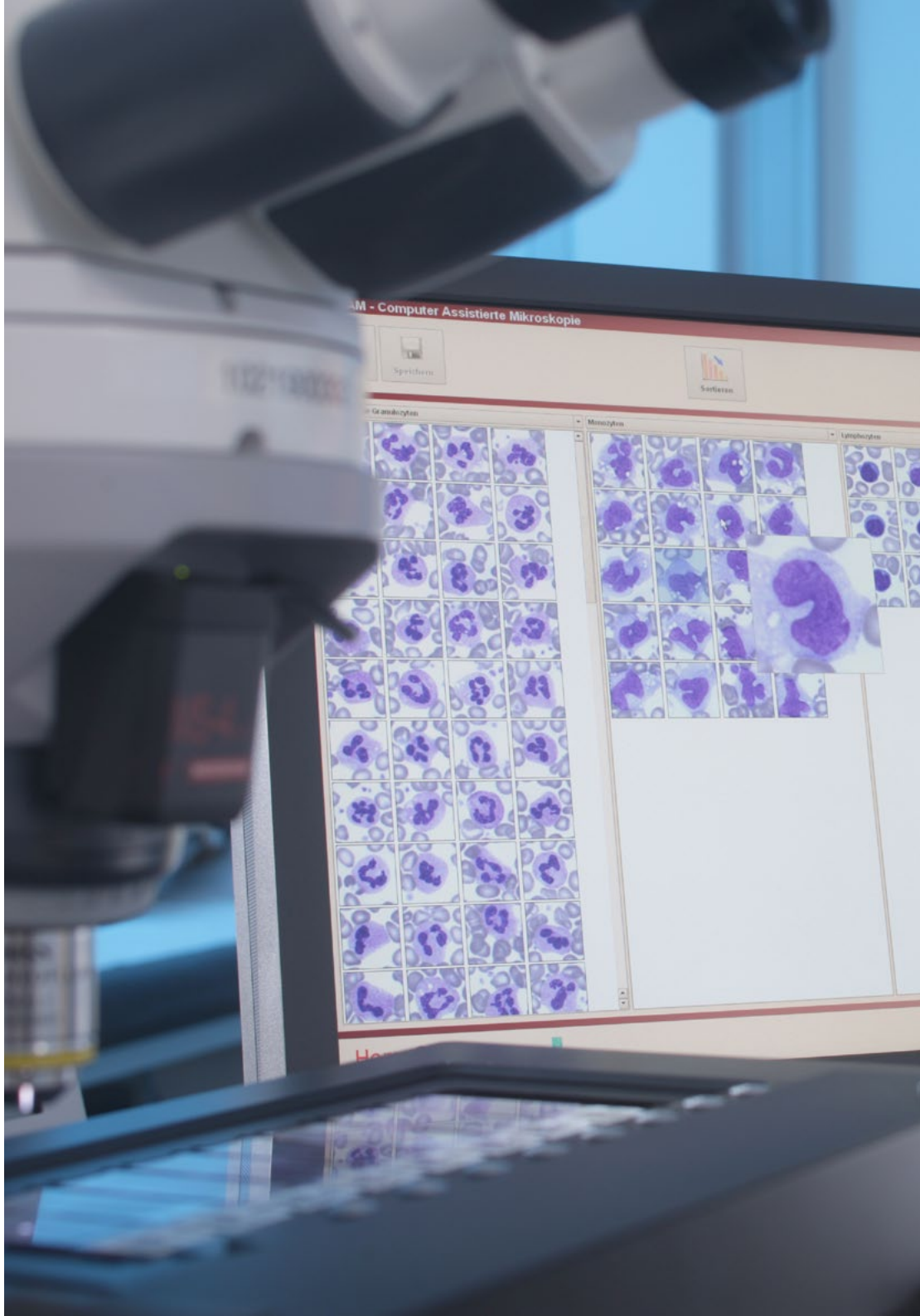
1.1. AI Technologies and Tools in Clinical Research
- 1.1.1. Use of Machine Learning to Identify Patterns in Clinical Data
- 1.1.2. Development of Predictive Algorithms for Clinical Trials
- 1.1.3. Implementation of AI Systems for Improved Patient Recruitment
- 1.1.4. Implementation of AI Systems for the Real-Time Analysis of groups Data

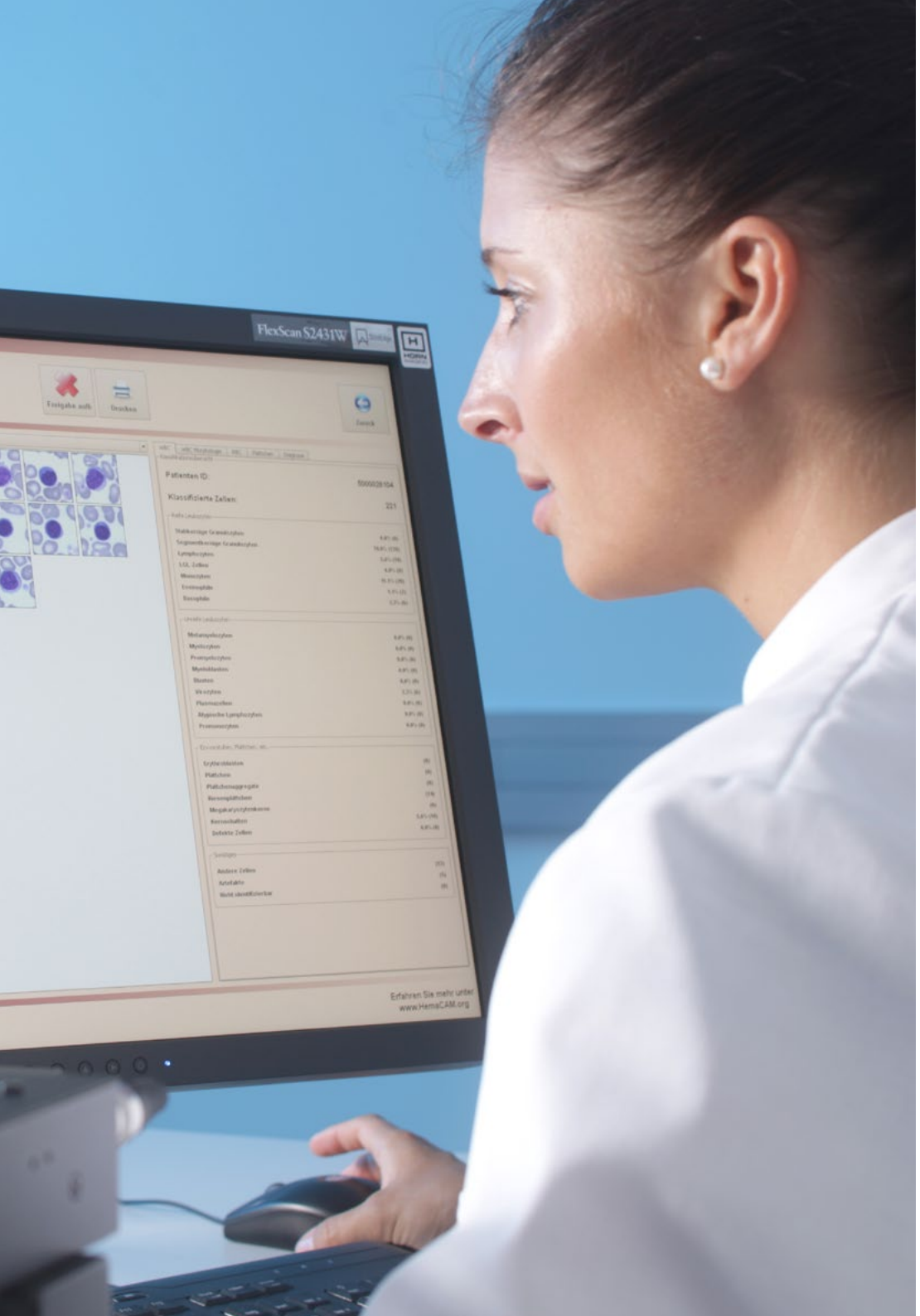
1.2. Statistical Methods and Algorithms in Clinical Trials
- 1.2.1. Application of Advanced Statistical Techniques for the Analysis of Clinical Data
- 1.2.2. Use of Algorithms for the Validation and Verification of Trial Results
- 1.2.3. Implementation of Regression and Classification Models in Clinical Studies
- 1.2.4. Analysis of Large Data Sets Using Computational Statistical Methods

1.3. Design of Experiments and Analysis of Results
- 1.3.1. Strategies for Efficient Clinical Trial Design Using AI
- 1.3.2. AI Techniques for Analysis and Interpretation of Experimental Data
- 1.3.3. Optimization of Research Protocols Using AI Simulations
- 1.3.4. Evaluation of the Efficacy and Safety of Treatments Using AI Models

1.4. Interpretation of Medical Images Using AI in Research
- 1.4.1. Development of AI systems for the Automatic Detection of Pathologies in Images
- 1.4.2. Use of Deep Learning for Classification and Segmentation in Medical Imaging
- 1.4.3. AI Tools for Improving Accuracy in Diagnostic Image
- 1.4.4. Analysis of Radiological and Magnetic Resonance Imaging using AI

1.5. Clinical Analysis and Biomedical Data Analysis
- 1.5.1. AI in Genomic and Proteomic Data Processing and Analysis
- 1.5.2. Tools for the Integrated Analysis of Clinical and Biomedical Data
- 1.5.3. Use of AI for Identifying Biomarkers in Clinical Research
- 1.5.4. Predictive Analytics of Clinical Outcomes Based on Biomedical Data





1.6. Advanced Data Visualization in Clinical Research
- 1.6.1. Development of Interactive Visualization Tools for Clinical Data
- 1.6.2. Use of AI in the Creation of Graphical Representations of Complex Data
- 1.6.3. Visualization Techniques for the Easy Interpretation of Research Results
- 1.6.4. Augmented and Virtual Reality Tools for the Visualization of Biomedical Data

1.7. Natural Language Processing in Scientific and Clinical Documentation
- 1.7.1. Application of NLP for the Analysis of Scientific Literature and Clinical Records
- 1.7.2. AI Tools for the Extraction of Relevant Information from Medical Texts
- 1.7.3. AI Systems for Summarizing and Categorizing Scientific Publications
- 1.7.4. Use of NLP in Identifying Trends and Patterns in Clinical Documentation

1.8. Heterogeneous Data Processing in Clinical Research
- 1.8.1. AI Techniques for Integrating and Analyzing Data from Diverse Clinical Sources
- 1.8.2. Tools for the Management of Unstructured Clinical Data
- 1.8.3. AI Systems for Clinical and Demographic Data Correlation
- 1.8.4. Analysis of Multidimensional Data to Obtain Clinical *Insights*

1.9. Applications of Neural Networks in Biomedical Research
- 1.9.1. Use of Neural Networks for Disease Modeling and Treatment Prediction
- 1.9.2. Implementation of Neural Networks in the Classification of Genetic Diseases
- 1.9.3. Development of Diagnostic Systems Based on Neural Networks
- 1.9.4. Application of Neural Networks in the Personalization of Medical Treatments

1.10. Predictive Modeling and its Impact on Clinical Research
- 1.10.1. Development of Predictive Models for the Anticipation of Clinical Outcomes
- 1.10.2. Use of AI in the Prediction of Side Effects and Adverse Reactions
- 1.10.3. Implementation of Predictive Models in Clinical Trial Optimization
- 1.10.4. Risk Analysis of Medical Treatments Using Predictive Modeling

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

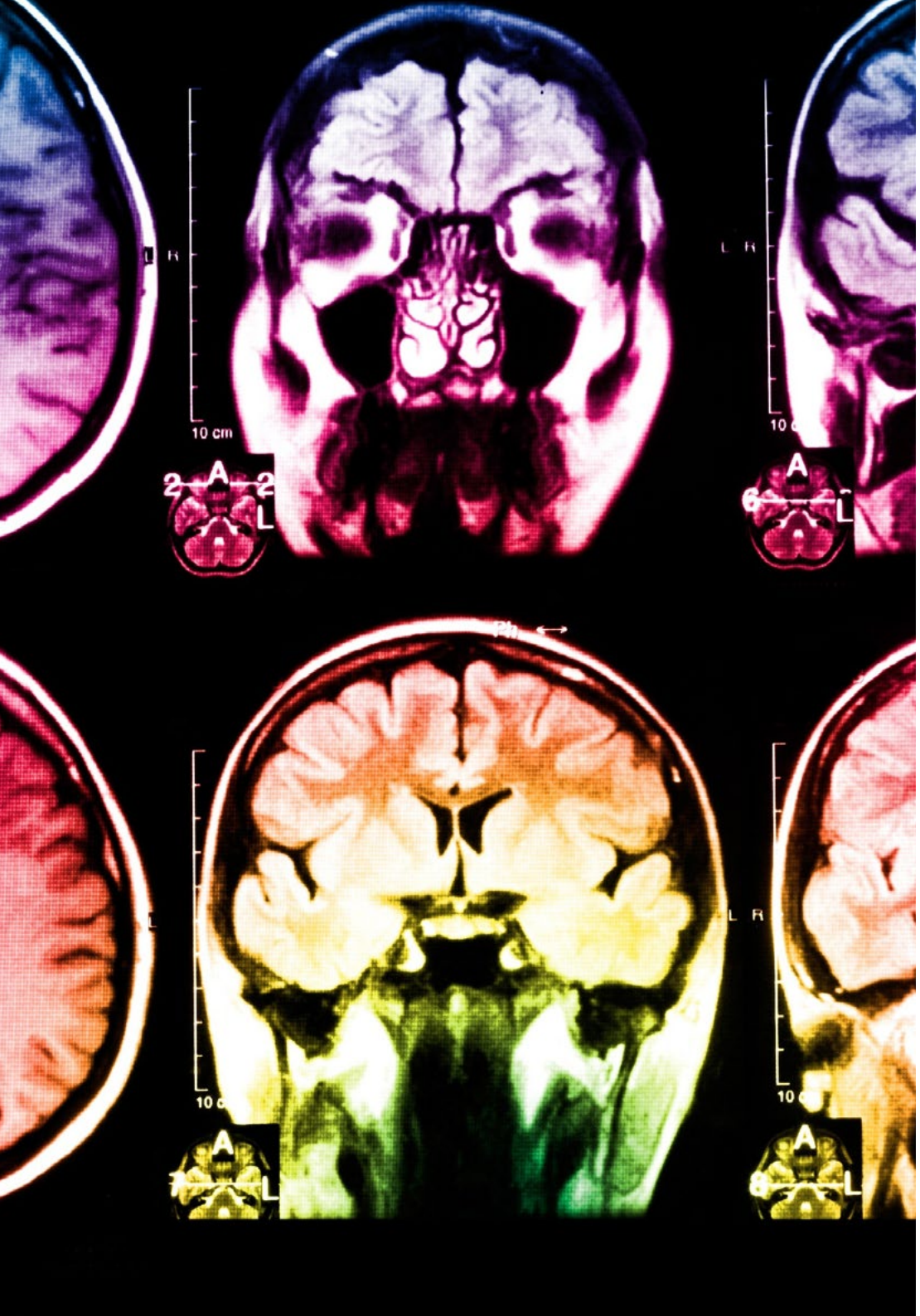
TECH effectively combines the Case Study methodology with a 100% online learning system based on repetition, which combines different teaching elements in each lesson.

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.

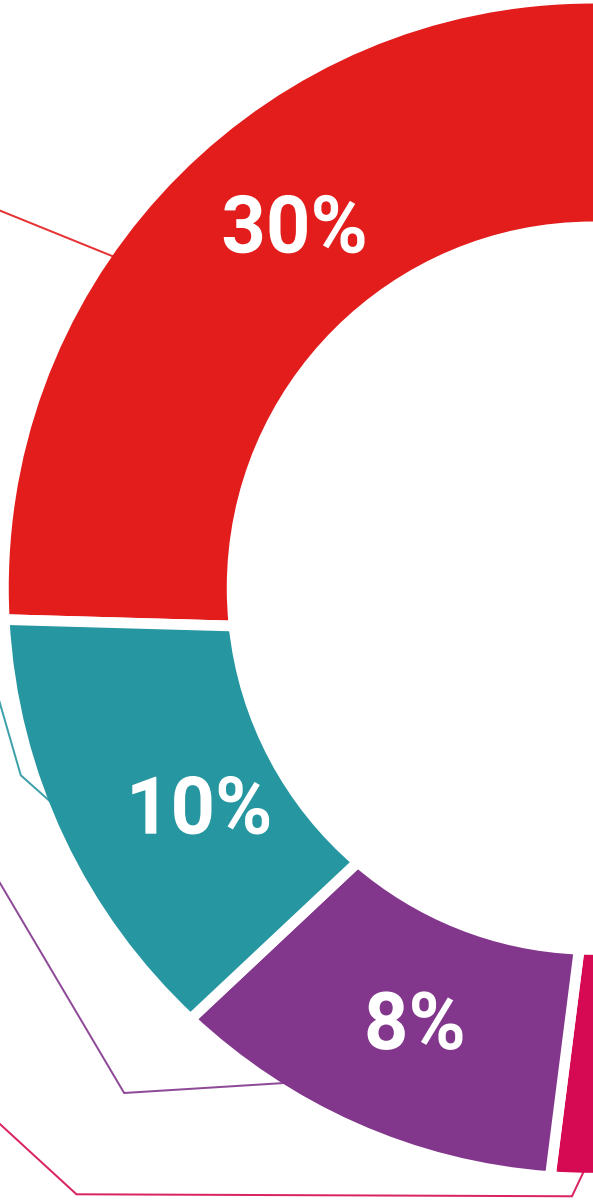
Learning from an Expert strengthens knowledge and memory, and generates confidence in future difficult decisions.

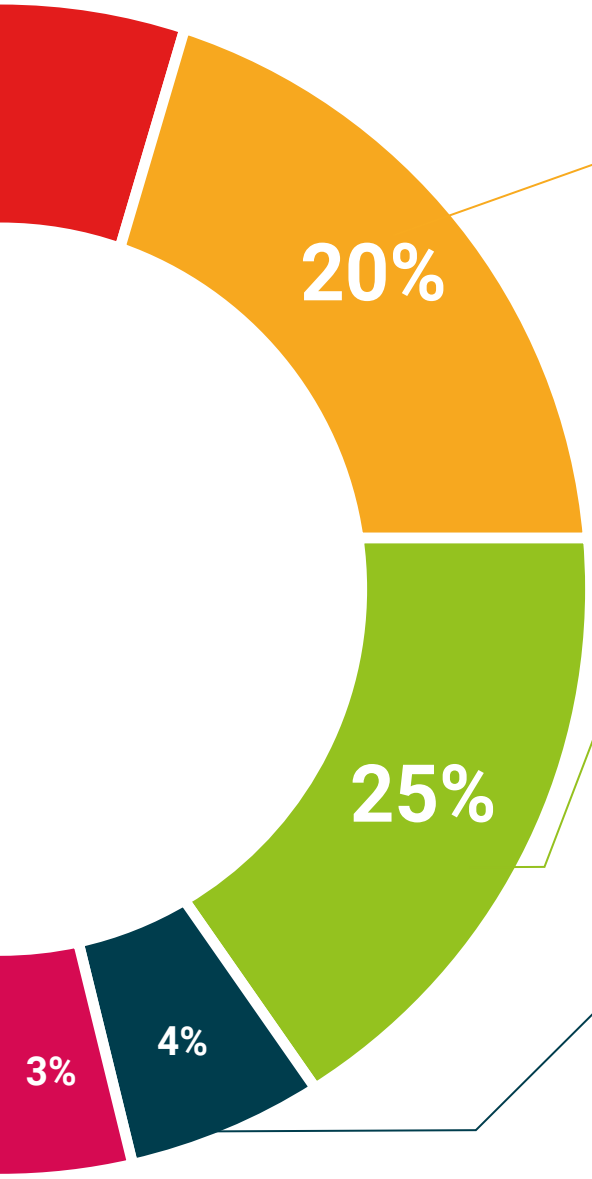
Practising Skills and Abilities

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

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

This **Postgraduate Certificate in Advanced Methods and Artificial Intelligence Tools for Clinical Research** contains the most complete and up-to-date 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 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 Methods and Artificial Intelligence Tools for Clinical Research**

Official Nº of Hours: **150 h.**


tech technological university

Awards the following

CERTIFICATE

to

Mr./Ms. _____, with identification number _____.

For having passed and accredited the following program

POSTGRADUATE CERTIFICATE

in

Advanced Methods and Artificial Intelligence Tools for Clinical Research

This is a qualification awarded by this University, equivalent to 150 hours, with a start date of dd/mm/yyyy and an end date of dd/mm/yyyy.

TECH is a Private Institution of Higher Education recognized by the Ministry of Public Education as of June 28, 2018.

June 17, 2020

Tere Guevara Navarro
Dean

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 EDUCATION will make the necessary arrangements to obtain it, at an additional cost.

tech technological university

Postgraduate Certificate

Advanced Methods and Artificial Intelligence Tools for Clinical Research

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

Postgraduate Certificate

Advanced Methods and Artificial Intelligence Tools for Clinical Research

tech technological university