Postgraduate Diploma

Application of Artificial Intelligence Technologies in Clinical Research

tech technological university

Postgraduate Diploma
Application of Artificial Intelligence Technologies in 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/pk/artificial-intelligence/postgraduate-diploma/postgraduate-diploma-application-artificial-intelligence-technologies-clinical-research

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01
Introduction

The implementation of Artificial Intelligence (AI) technologies is completely transforming the way medical care is performed in general terms. One example of this is that algorithms help doctors diagnose pathologies more accurately and earlier.

For example, in cancer detection, this system analyzes images such as MRIs or mammograms to identify signs of malignancy. For this reason, more and more healthcare institutions are demanding the incorporation of specialists in this field. To take advantage of these opportunities, experts need to keep up to date with the latest tools to provide quality-defined care. In response to this, TECH has developed an online program that will keep them on the cutting edge of technology.

"

Through an extensive library of the most innovative multimedia resources, you will be able to integrate wearable devices and remote monitoring into clinical studies"

AI is driving the development of vaccines and treatments to ensure the well-being of the population. Its tools streamline these processes by analyzing large datasets quickly and efficiently. This is especially relevant in emergency situations (such as epidemics or pandemics), where speed in providing solutions is key. Algorithms are also useful for designing new molecules and chemical compounds for the management of conditions. In this way, the identification of drug candidates can be significantly accelerated and the costs associated with compound synthesis can be reduced.

In this context, TECH implements a Postgraduate Diploma that will focus on AI tools to simulate vaccine and drug responses. Therefore, the academic pathway will delve into the development of models aimed at understanding immunological mechanisms and designing personalized therapies. In addition, the agenda will analyze various procedures to improve precision in diagnostic imaging, using instruments such as magnetic resonance or augmented reality. The program will also consider the ethical and legal aspects of Machine Learning in Clinical Research. In this sense, the program will delve into the regulations in the development and application of AI technologies in the biomedical field.

All this, following an excellent methodology 100% online, which allows the student to update without the need to make uncomfortable daily commutes to a study center. In the same way, you will enjoy a series of first level didactic contents, which have been elaborated by specialists in Machine Learning who work actively in Clinical Research. Therefore, the knowledge assimilated during the program will be fully in tune with the latest advances in the health sector.

This **Postgraduate Diploma in Application of Artificial Intelligence Technologies in 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 Application of AI Technologies in the 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 develop a highly ethical awareness, which will allow you to stand out for your values during your clinical procedures"

You will delve into the use of neural networks in biomedical research, offering an updated view on the integration of AI in healthcare.

Take advantage of all the benefits of the Relearning methodology, which will allow you to organize your time and pace of study, adapting to your schedule.

"*From biomedical image analysis, to the integration of Artificial Intelligence in precision medicine, you will address a wide range of topics essential to modern medical care*"

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.

02
Objectives

This Postgraduate Diploma will provide graduates with the most cutting-edge technological tools and knowledge in the application of AI in the clinical setting. Through this program, professionals will effectively implement the latest trends to design treatments based on the personal needs of each user. In this way, specialists will improve their medical care in order to provide care based on excellence.

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"You will develop skills in Machine Learning and address clinical problems with data-driven solutions, all through a 100% online program"

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

- Understand and apply genomic sequencing technologies, data analysis with AI and use of AI in biomedical imaging

- Acquire expertise in key areas such as personalization of therapies, precision medicine, AI-assisted diagnostics and clinical trial management

- Develop skills to address contemporary challenges in the biomedical field, including the efficient management of clinical trials and the application of AI in immunology

- Delve into ethical dilemmas, review legal considerations, explore the socioeconomic and future impact of AI in healthcare, and promote innovation and entrepreneurship in the field of clinical AI

Specific Objectives

Module 1. AI Methods and Tools for Clinical Research

- 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

Module 2. Practical Application of AI in Clinical Research

- Acquire expertise in key areas such as personalization of therapies, precision medicine, AI-assisted diagnostics, clinical trial management and vaccine development
- Incorporate robotics and automation in clinical laboratories to optimize processes and improve the quality of results
- Explore the impact of AI in microbiome, microbiology, wearables and remote monitoring in clinical studies
- Address contemporary challenges in the biomedical field, such as efficient management of clinical trials, development of AI-assisted treatments, and application of AI in immunology and immune response studies
- Innovate in AI-assisted diagnostics to improve early detection and diagnostic accuracy in clinical and biomedical research settings

Module 3. Ethical, Legal and Future Aspects of AI in Clinical Research

- Understand the ethical dilemmas that arise when applying AI in clinical research and review the relevant legal and regulatory considerations in the biomedical field
- Address specific challenges in the management of informed consent in AI studies
- Investigate how AI can influence equity and access to health care
- Analyze future perspectives on how AI will shape Clinical Research, exploring its role in the sustainability of biomedical research practices and identifying opportunities for innovation and entrepreneurship
- Comprehensively address the ethical, legal and socioeconomic aspects of AI-driven Clinical Research

You will be able to provide more accurate, efficient and tailored medical care to the particular needs of each patient"
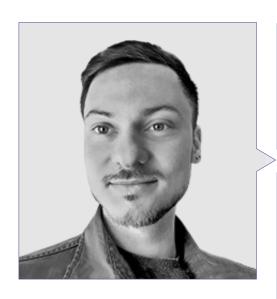
Course Management

TECH transforms the educational experience of graduates thanks to an exceptional teaching team, formed by specialists in AI applied to Clinical Research. Leaders in their respective fields who bring an unparalleled perspective to each lesson, sharing with the student not only the latest theory, but also the practical application in this field of expertise. Each faculty member brings with them years of experience in the most prestigious hospitals worldwide. Therefore, professionals have the guarantees they demand to expand their knowledge and make a quality leap in their careers.

You will gain access to cutting-edge knowledge, guided by professionals who will prepare you to lead the transformation in medical care"

Management

Dr. Peralta Martín-Palomino, Arturo

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

Mr. 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

04
Structure and Content

This university program will provide graduates with a comprehensive understanding of the implementation of AI technologies in clinical research.
To achieve this, the curriculum will cover from the theoretical principles to the practical application of Machine Learning in the clinical environment. Professionals will gain solid skills in biomedical data analysis, clinical information processing and personalization of clinical treatments. At the same time, the curriculum will delve into the ethical challenges and legal considerations associated with the implementation of AI in the medical field.

You will address aspects such as sustainability in biomedical research, future trends and innovation in the field of AI applied to Clinical Research"

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

Module 2. Practical Application of AI in Clinical Research

2.1.   Genomic Sequencing Technologies and Data Analysis with AI
　　2.1.1.   Use of AI for Rapid and Accurate Analysis of Genetic Sequences
　　2.1.2.   Implementation of Automatic Learning Algorithms in the Interpretation of Genomic Data
　　2.1.3.   AI Tools to Identify Genetic Variants and Mutations
　　2.1.4.   Application of AI in Genomic Correlation with Diseases and Traits

Module 3. Ethical, Legal and Future Aspects of AI in Clinical Research

3.7. AI and Sustainability in Biomedical Research

3.7.1. Assessing the Environmental Impact and Resources Associated with the Implementation of AI in Biomedical Research

3.7.2. Development of Sustainable Practices in the Integration of AI Technologies in Clinical Research Projects

3.7.3. Ethics in Resource Management and Sustainability in the Adoption of AI in Biomedical Research

3.8. Auditing and Explainability of AI Models in the Clinical Setting

3.8.1. Development of Audit Protocols for Assessing the Reliability and Accuracy of AI Models in Clinical Research

3.8.2. Ethics in the Explainability of Algorithms to Ensure Understanding of Decisions Made by AI Systems in Clinical Contexts

3.8.3. Addressing Ethical Challenges in Interpreting Results of AI Models in Biomedical Research

3.9. Innovation and Entrepreneurship in the field of Clinical AI

3.9.1. Ethics in Responsible Innovation When Developing AI Solutions for Clinical Applications

3.9.2. Development of Ethical Business Strategies in the Field of Clinical AI

3.9.3. Ethical Considerations in the Commercialization and Adoption of AI Solutions in the Clinical Sector

3.10. Ethical Considerations in International Clinical Research Collaboration

3.10.1. Development of Ethical and Legal Agreements for International Collaboration in AI-driven Research Projects

3.10.2. Ethics in Multi-Institution and Multi-Country Involvement in Clinical Research with AI Technologies

3.10.3. Addressing Emerging Ethical Challenges Associated with Global Biomedical Research Collaborations

Enjoy 24-hour access to the most innovative educational material offered by this Postgraduate Diploma"

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.

01 learning from evidence

02 relearning from evidence

03 testing

04 learning from an expert

05 neurocognitive context dependent learning

06 Von-Restorff effect

07 case based learning through storytelling

08 competencies testing (retesting)

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.

30%

10%

8%

20%

25%

4%

3%

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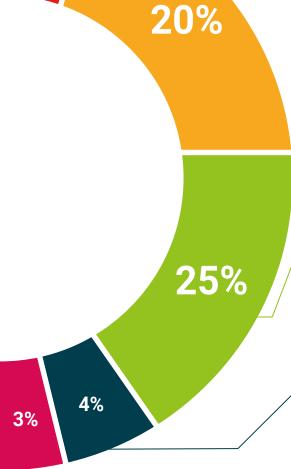
This exclusive educational system for presenting multimedia content was awarded by Microsoft as a "European Success Story".

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.

Certificate

The Postgraduate Diploma in Application of Artificial Intelligence Technologies in Clinical Research guarantees students, in addition to the most rigorous and up-to-date education, access to a Postgraduate Diploma 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 Diploma in Application of Artificial Intelligence Technologies in 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 Diploma** issued by **TECH Technological University** via tracked delivery*.

The certificate issued by **TECH Technological University** will reflect the qualification obtained in the Postgraduate Diploma, and meets the requirements commonly demanded by labor exchanges, competitive examinations, and professional career evaluation committees.

Title: **Postgraduate Diploma in Application of Artificial Intelligence Technologies in Clinical Research**

Official Nº of Hours: **450 h.**

tech technological university

Awards the following

CERTIFICATE
to

Mr./Ms. _____, with identification number _____.
For having passed and accredited the following program

POSTGRADUATE DIPLOMA
in

Application of Artificial Intelligence Technologies in Clinical Research

This is a qualification awarded by this University, equivalent to 450 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.

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