

# Postgraduate Diploma Blockchain and Digital Twins

```
...use_x = False
..._mod.use_y = True
...or_mod.use_z = False
...operation == "MIRROR_Z":
mirror_mod.use_x = False
mirror_mod.use_y = False
mirror_mod.use_z = True

#selection at the end - add back the deselected mirror mod
mirror_ob.select= 1
modifier_ob.select=1
bpy.context.scene.objects.active = modifier_ob
print("Selected" + str(modifier_ob)) # modifier ob is the act
#mirror_ob.select = 0
line = bpy.context.selected_objects[0]
...

```



## Postgraduate Diploma Blockchain and Digital Twins

- » Modality: online
- » Duration: 6 months
- » Certificate: TECH Global University
- » Credits: 18 ECTS
- » Schedule: at your own pace
- » Exams: online

Website: [www.techtitute.com/us/information-technology/postgraduate-diploma/postgraduate-diploma-blockchain-digital-twins](http://www.techtitute.com/us/information-technology/postgraduate-diploma/postgraduate-diploma-blockchain-digital-twins)

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# 01

# Introduction

There are more and more tools, languages, algorithms and frameworks that allow the implementation of Blockchain technology. This 100% online degree provides a theoretical and practical analysis of knowledge and data management through Blockchain technology, applied to guarantee security, quality and traceability, as well as to increase the capacity to analyze this information through new work technologies. This program allows students to identify application cases of Blockchain technology and Digital Twins, and to approach the different case studies from a broad perspective, defining specific solutions for their application in current and existing environments within the industry.



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*You will become a great Communication Management, an expert in the most advanced and most applicable technologies of today and the future"*

In a world where digital technology is growing by leaps and bounds, it is necessary to perform a detailed analysis of Blockchain technology: characteristics, elements, implementation models and algorithms, frameworks and platforms most commonly used, as well as the most common use cases in the business environment. To this end, this training addresses from the problem of securitization, transparency and monitoring of communications, to the implementation of blockchain technology, through its evolution towards solving the problems of communication between nodes, generation of unique elements and the processes of tokenization of information.

The Digital Twin, which has an infinite number of applications and radically changes the laboratory or test models, will also be explored. With the application of the implementation of a Digital Twin, the Students will be able to simulate and perform unlimited tests before taking their project into production and operation. In addition, during the operation phase, it will allow them to anticipate failures or anomalous behavior by implementing advanced predictive maintenance algorithms.

This program generates specialized knowledge so that the engineer is able to analyze, define and apply the best implementation strategy for this type of solutions. The Student Body will deepen the scope of application of each technology, understanding the competitive advantages they provide. Furthermore, graduates have the best 100% online study methodology, which eliminates the need to attend classes in person or be constrained by a predetermined schedule.

The **Postgraduate Diploma in Blockchain and Digital Twins** contains the most complete and up-to-date educational program on the market. Its most notable features are:

- ◆ Case studies presented by experts in Blockchain and Digital Twins
- ◆ The graphic, schematic, and practical contents with which they are created, provide 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



*You are looking at a high-level program, aimed at Communication Management like you, who want to lead the digital transformation and evolution in the world"*



“

*The professional will develop Blockchain technology, where there is room for endless applications, such as traceability, or the safeguarding of testimonies, documentary evidence and interrogation, among others”*

*You will cover front-line technologies and disciplines, applied to real projects and use cases of direct application in the professional market.*

*You will delve in the Digital Twins, a field with increasing demand and for which there is a very high lack of qualified profiles.*

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.

Its multimedia content, developed with the latest educational technology, will allow professionals to learn in a contextual and situated learning environment, i.e. a simulated environment that will provide immersive education, programmed to prepare for real situations.

The design of this program focuses on Problem-Based Learning, by means of which professionals must try to solve the different professional practice situations that are presented to them throughout the course. For this purpose, the students will be assisted by an innovative interactive video system created by renowned and experienced experts.



# 02 Objectives

The Postgraduate Diploma in Blockchain and Digital Twins is designed to approach the subject from a practical and engineering-focused point of view. In this way, a sense of security is generated in the Student Body, which will allow him to be more effective in his daily practice. The direct application of the knowledge acquired about Blockchain and Digital Twins in real projects is an added professional value, which very few engineers specialized in Information and Communication Technologies can offer. This is precisely what makes this program unique in the market, since the computer scientists who take it will be unique professionals in their sector.







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*Thanks to its practical nature, this Postgraduate Diploma will enable you to be more effective in your daily practice"*



## General Objectives

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- ◆ Generate specialized knowledge on Blockchain technology
- ◆ Examine the tools, algorithms, frameworks and platforms for their implementation
- ◆ Identify the main advantages of applying Blockchain technology in industry
- ◆ Analyze the current landscape of Digital Twins and associated technologies
- ◆ Determine the main applications of the Digital Twins
- ◆ Propose application scenarios for technologies derived from the Digital Twins



*You will be able to develop solutions based on Blockchain technologies by, identifying improvement points within existing architectures"*





## Specific Objectives

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### **Module 1. R&D in Complex Software Systems. Blockchain. Public and Private Nodes**

- ◆ Analyze requirements for solution definition
- ◆ Develop solutions based on Blockchain technologies (C#/Go)
- ◆ Optimize the performance of already implemented solutions
- ◆ Establish the basis for enabling the scalability of such solutions
- ◆ Fundamentalize the application of different tools, algorithms, Frameworks or platforms in the implementation of Blockchain solutions

### **Module 2. Data Operations in Blockchain. Innovation in Information Management**

- ◆ Identify improvement points within existing architectures
- ◆ Evaluate the costs of applying the improvements to be implemented
- ◆ Fundamentalize the application of different tools in the implementation of Blockchain solutions

### **Module 3. Digital Twins Innovative Solutions**

- ◆ Acquire a detailed view of the influence of the Digital Twins on the future of product and service development
- ◆ Pinpoint the applications of the Digital Twins
- ◆ Demonstrate the utility of Digital Twins in the value chain
- ◆ Determine specific uses of Digital Twins
- ◆ Assess the feasibility of implementing a Digital Twin
- ◆ Identify concrete cases of application of the Digital Twins
- ◆ Justify uses and models of the Digital Twins
- ◆ Generate interest in the implementation of models



03

# Course Management

This Postgraduate Diploma in Blockchain and Digital Twins has a team highly qualified with extensive experience in the sector, who will offer the best content for the specialization of the graduate during their journey. Students of this program become great Communication Management, experts in the most advanced and most applicable technologies of the present and the future.





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*You will be empowered to be able to apply Blockchain and Digital Twins directly to the successful completion of your studies”*

## Management



### Mr. Molina Molina, Jerónimo

- ♦ Head of the Artificial Intelligence Department at Ibermática
- ♦ IA Engineer & Software Architect at NASSAT - Internet Satellite in Motion
- ♦ Senior Consultant at Hexa Ingenieros. Introducer of Artificial Intelligence (ML and CV)
- ♦ Expert in Artificial Intelligence Based Solutions, in the fields of Computer Vision, ML/DL and NLP
- ♦ Expert in Business Creation and Development at Bancaixa - FUNDEUN Alicante
- ♦ Computer Engineer from the University of Alicante
- ♦ Master's Degree in Artificial Intelligence from the Catholic University of Avila
- ♦ Executive MBA (European Business Campus Forum)

## Professors

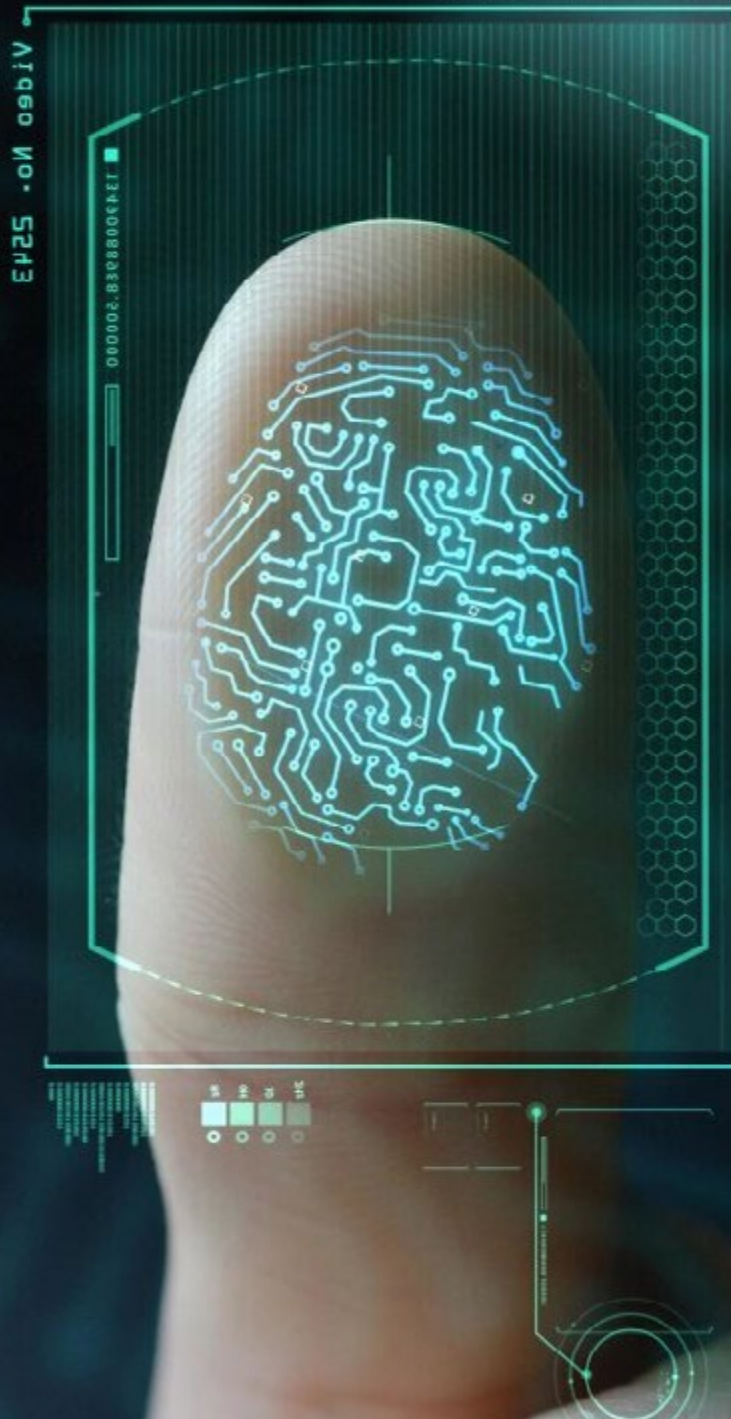
### Mr. Díaz Morales, Ángel

- ♦ Computer Engineer and Technology Consultant
- ♦ Founder and CTO of Wozala
- ♦ Technological Consultant at Técnicas Reunidas
- ♦ Project Manager at Cetelem, Gfi Spain and ISBAN
- ♦ Technology and Project Design Coordinator at Bankia and BBVA
- ♦ Programmer at Idom Consulting
- ♦ Computer Engineer at the University of Zaragoza

### Mr. Mostajo Fernández, Iván

- ♦ Specialist in Project Management and Systems Computing
- ♦ ISBAN Consultant in Santander Consumer Finance Spain
- ♦ Technical Consultant at Signum Software and at Eutropraxis - Petrobass
- ♦ Technical Project Manager at Infortect Ingeniería
- ♦ Technical Engineer in Computer Systems from the Universidad Alcalá de Henares





### Dr. Villalba García, Alfredo

- ◆ Industrial Engineer with specialization in Domotics and Inmotics
- ◆ Director of Fractalia Smart Projects
- ◆ CEO and Founding Partner of INMOMATICA
- ◆ Director of Technology and Operations at BBVA
- ◆ Industrial Systems Director at Alcatel
- ◆ Ph.D. in La Computer Science from the University of Fontainebleau
- ◆ Professional Master's Degree in Domotics and Industrial Automation, Polytechnic University of Madrid
- ◆ Member of the Board of Directors of Spanish Association of Home Automation

“

*Take the opportunity to learn about the latest advances in this field in order to apply it to your daily practice"*



# 04

# Structure and Content

A syllabus has been established and deployed in 3 modules, which offer a broad perspective on Blockchain and the engineering-focused Digital Twins. Modules 1 and 2 are dedicated to Blockchain, a technology with applications that go beyond the Crypto world and where a myriad of applications can be found. Module 3 delves into another highly competitive field, that of Digital Twins, a field with increasing demand and for which there is a very high shortage of qualified profiles. These subjects are covered in depth, with supporting material, oriented to experienced Communication Management with a great interest in the topics of study.







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*This program gives you the keys and tools to use the technologies of the future, starting from the present moment"*



## Module 1. R&D in Complex Software Systems. Blockchain. Public and Private Nodes

- 1.1. Blockchain and Distributed Data
  - 1.1.1. Information Communications. New Paradigm
  - 1.1.2. Privacy and Transparency
  - 1.1.3. Information Exchange. New Models
- 1.2. Blockchain.
  - 1.2.1. Blockchain.
  - 1.2.2. Blockchain. Technological Base
  - 1.2.3. Blockchain. Components and Elements
- 1.3. Blockchain. Public Nodes
  - 1.3.1. Blockchain. Public Nodes
  - 1.3.2. Working Algorithms in Public Nodes
    - 1.3.2.1. Proof of Work
    - 1.3.2.2. Proof of Stake
    - 1.3.2.3. Proof of Authority
  - 1.3.3. Use Cases and Application
    - 1.3.3.1. Smart Contracts
    - 1.3.3.2. Dapps
- 1.4. Blockchain. Private Nodes
  - 1.4.1. Blockchain. Private Nodes
  - 1.4.2. Working Algorithms in Private Nodes
    - 1.4.2.1. Proof of Work
    - 1.4.2.2. Proof of Stake
    - 1.4.2.3. Proof of Authority
  - 1.4.3. Use Cases and Application
    - 1.4.3.1. Crypto Economy
    - 1.4.3.2. Game Theory
    - 1.4.3.3. Market Modeling
- 1.5. Blockchain. Work Frameworks
  - 1.5.1. Blockchain. Work Frameworks
  - 1.5.2. Types
    - 1.5.2.1. Ethereum
    - 1.5.2.2. Hyperledger Fabric
  - 1.5.3. Application Examples (Ethereum)
    - 1.5.3.1. C#
    - 1.5.3.2. Go
- 1.6. Blockchain in Finance
  - 1.6.1. The Impact of Blockchain on the Financial World
  - 1.6.2. Advanced Technologies
  - 1.6.3. Use Cases and Application
    - 1.6.3.1. Information Assurance
    - 1.6.3.2. Follow-Up and Monitoring
    - 1.6.3.3. Certified Transmissions
    - 1.6.3.4. Examples within the Financial Sector
- 1.7. Blockchain in the Industrial Environment
  - 1.7.1. Blockchain and Logistics
  - 1.7.2. Advanced Technologies
  - 1.7.3. Use Cases and Application
    - 1.7.3.1. Smart Contracts between Suppliers and Customers
    - 1.7.3.2. Support in Automation Processes
    - 1.7.3.3. Real-Time Product Traceability
    - 1.7.3.4. Examples within the Industrial Sector
- 1.8. Blockchain. Transaction Tokenization
  - 1.8.1. Tokenizing the World
  - 1.8.2. Smart Contracts Platforms (Smart Contracts)
    - 1.8.2.1. Bitcoin
    - 1.8.2.2. Ethereum
    - 1.8.2.3. Other Emerging Platforms
  - 1.8.3. Communication: The Oracle Problem
  - 1.8.4. Uniqueness: NFTs
  - 1.8.5. Tokenization: STOs

- 1.9. Blockchain. Examples of Use
  - 1.9.1. Use Case Description
  - 1.9.2. Practical Implementation (C#/Go)
- 1.10. Distributed Data. Blockchain applications, Present and Future
  - 1.10.1. Distributed Data. Present and Future Applications of Blockchain
  - 1.10.2. The Future of Communication
  - 1.10.3. Next Steps

## Module 2. Data Operations in Blockchain. Innovation in Information Management

- 2.1. Information Management
  - 2.1.1. Information Management
  - 2.1.2. Management Applied to Knowledge
- 2.2. Blockchain in Information Management
  - 2.2.1. Blockchain in Information Management
    - 2.2.1.1. Data Security
    - 2.2.1.2. Data Quality
    - 2.2.1.3. Traceability of Information
    - 2.2.1.4. Other Additional Benefits
  - 2.2.2. Additional Considerations
- 2.3. Data Security
  - 2.3.1. Data Security
  - 2.3.2. Security and Privacy
  - 2.3.3. Use Cases and Application
- 2.4. Data Quality
  - 2.4.1. Data Quality
  - 2.4.2. Reliability and Consensus
  - 2.4.3. Use Cases and Application
- 2.5. Traceability of Information
  - 2.5.1. Data Traceability
  - 2.5.2. Blockchain in Data Traceability
  - 2.5.3. Use Cases and Application
- 2.6. Analysis of Information
  - 2.6.1. Big Data
  - 2.6.2. Blockchain and Big Data
  - 2.6.3. Real-Time Data Accessibility
  - 2.6.4. Use Cases and Application
- 2.7. Application of BC (I). Information Security
  - 2.7.1. Information Security
  - 2.7.2. Use Case
  - 2.7.3. Practical Implementation
- 2.8. Application of BC (II). Information Quality
  - 2.8.1. Information Quality
  - 2.8.2. Use Case
  - 2.8.3. Practical Implementation
- 2.9. Application of BC (III). Traceability of Information
  - 2.9.1. Traceability of Information
  - 2.9.2. Use Case
  - 2.9.3. Practical implementation
- 2.10. Blockchain. Practical Applications
  - 2.10.1. Blockchain in Practice
    - 2.10.1.1. Data Centers
    - 2.10.1.2. Sectorial
    - 2.10.1.3. Multisectoral
    - 2.10.1.4. Geographical

## Module 3. Digital Twins. Innovative Solutions

- 3.1. Digital Twins
  - 3.1.1. Digital Twins Basic Concepts
  - 3.1.2. Digital Twins Technological Evolution
  - 3.1.3. Digital Twins Typology
- 3.2. Digital Twins Applicable Technologies
  - 3.2.1. Digital Twins Platforms
  - 3.2.2. Digital Twins Interfaces
  - 3.2.3. Digital Twins Typology
- 3.3. Digital Twins Sectors and Examples of Use
  - 3.3.1. Digital Twins: Techniques and Uses
  - 3.3.2. Industries
  - 3.3.3. Architecture and Cities
- 3.4. Industry 4.0. Digital Twin Applications
  - 3.4.1. Industry 4.0
  - 3.4.2. Environment
  - 3.4.3. Digital Twin Applications in Industry 4.0
- 3.5. Smart Cities based on Digital Twins
  - 3.5.1. Models
  - 3.5.2. Categories
  - 3.5.3. Future of Smart Cities based on Digital Twins
- 3.6. IoT Applied to Digital Twins
  - 3.6.1. IoT. Link with Digital Twins
  - 3.6.2. IoT. Relationship with Digital Twins
  - 3.6.3. IoT. Problems and Possible Solutions
- 3.7. Digital Twin Environment
  - 3.7.1. Companies
  - 3.7.2. Organisation
  - 3.7.3. Implications





- 3.8. Digital Twin Market
  - 3.8.1. Platforms
  - 3.8.2. Suppliers
  - 3.8.3. Associated Services
- 3.9. Future of Digital Twins
  - 3.9.1. Immersiveness
  - 3.9.2. Augmented Reality
  - 3.9.3. Biointerfaces
- 3.10. Digital Twins Present and future results
  - 3.10.1. Platform
  - 3.10.2. Technologies
  - 3.10.3. Sectors

“ After successfully completing this program, you will have a global vision to apply the different technologies involved in global digitalization in your industrial project”



# 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 Diploma in Blockchain and Digital Twins guarantees, in addition to the most rigorous and up-to-date education, access to a Postgraduate Diploma issued by TECH Global University.



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*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 Diploma in Blockchain and Digital Twins** 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.

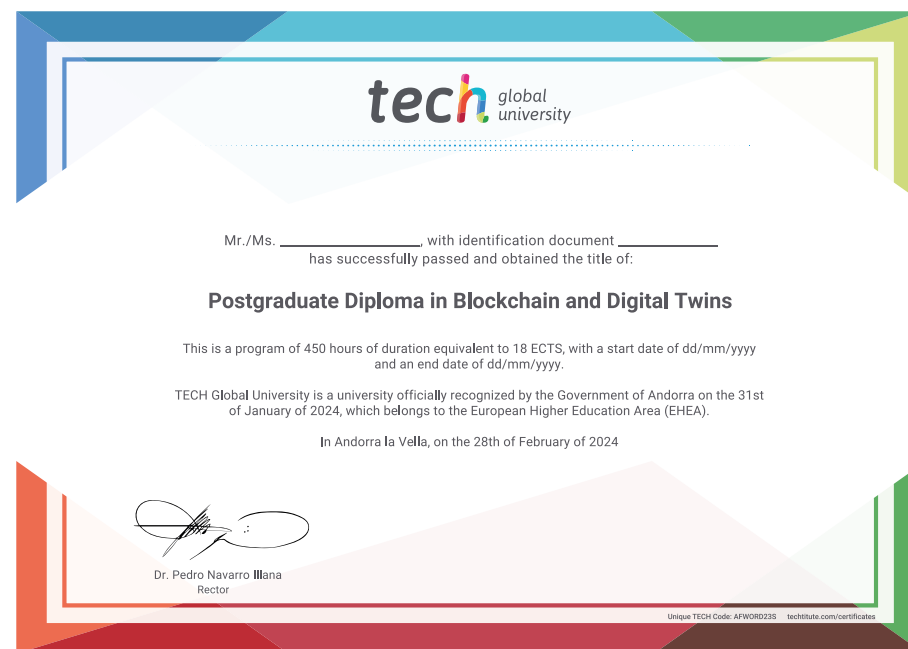
This **TECH Global University** title is a European program of continuing education and professional updating that guarantees the acquisition of competencies in its area of knowledge, providing a high curricular value to the student who completes the program.

Title: **Postgraduate Diploma in Blockchain and Digital Twins**

Modality: **online**

Duration: **6 months**

Accreditation: **18 ECTS**



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





## Postgraduate Diploma Blockchain and Digital Twins

- » Modality: online
- » Duration: 6 months
- » Certificate: TECH Global University
- » Credits: 18 ECTS
- » Schedule: at your own pace
- » Exams: online

# Postgraduate Diploma Blockchain and Digital Twins

