

# Postgraduate Diploma Blockchain and Digital Twins



## 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/engineering/postgraduate-diploma/postgraduate-diploma-blockchain-digital-twins](http://www.techtitute.com/us/engineering/postgraduate-diploma/postgraduate-diploma-blockchain-digital-twins)

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# 01

# Introduction

In a world where all things digital are growing by leaps and bounds, a detailed analysis of Blockchain technology is necessary. Its application is necessary to ensure safety, quality and traceability, as well as to increase the capacity of information analysis through new technologies in the industry. This 100% online program covers a theoretical and practical analysis of knowledge and data management, through Blockchain technology and the application of Digital Twins. This specialized program allows engineers to identify cases of application of both technologies and to approach the different practical cases from a broad perspective. This will enable them to define specific solutions for application in current and existing environments within the engineering field.



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

There are more and more tools, languages, algorithms and frameworks that allow the implementation of Blockchain technology. To this end, this course addresses the problem of securitization, transparency and monitoring of communications, as well as the implementation of blockchain technology. All this through its evolution towards the resolution of industrial communication problems between nodes, generation of unique elements and information tokenization processes.

On the other hand, there are the Digital Twins, which have an infinite number of applications and are capable of radically changing test models. With the implementation of a Digital Twin, the engineer will be able to simulate and perform unlimited tests before taking their industrial 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 in a real case. The graduate will deepen the scope of application of each technology, understanding the competitive advantages they provide. In addition, the student has the best, fully online study methodology, which eliminates the need to attend classes in person and to have a stipulated timetable.

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

“

*It will address different practical events from a broad perspective and thus define specific solutions for multiple use cases and applications within the industry”*

The program’s teaching staff includes professionals from the sector who contribute their work experience to this training program, as well as renowned specialists from leading societies and prestigious universities.

The multimedia content, developed with the latest educational technology, will provide professionals with situated and contextual learning, i.e., a simulated environment that will provide immersive training, designed for training oneself 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 student will be assisted by an innovative interactive video system created by renowned and experienced experts.

*You will apply leading technologies and disciplines to real projects and use cases of direct application in the industrial market.*

*You will acquire a deeper knowledge of Digital Twins, a field with increasing demand and for which there is a very high shortage of qualified profiles.*



# 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, the graduate will feel a sense of security that will allow them to be more effective in their 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.







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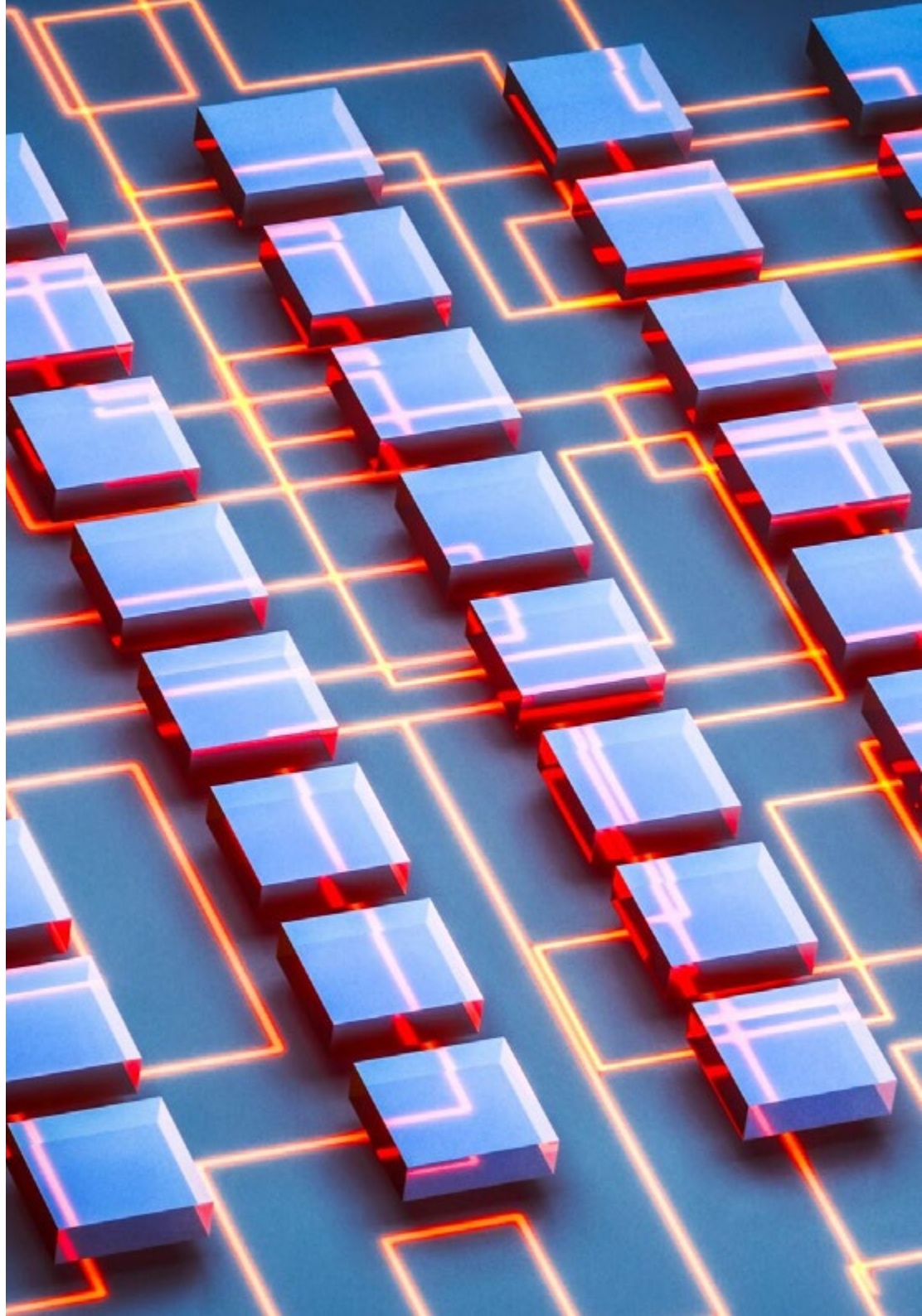
*Thanks to its practical nature, this Postgraduate Diploma will enable you to be more effective in your daily practice"*



## 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.





## 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).
- ◆ Identify improvement points within existing architectures
- ◆ Evaluate the costs of applying the improvements to be implemented.
- ◆ 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*

- ◆ Analyze requirements for the definition of solutions
- ◆ Develop solutions based on *Blockchain* technologies
- ◆ Identify improvement points within existing architectures
- ◆ Evaluate the costs of applying the improvements to be implemented.
- ◆ Optimize the performance of already implemented solutions
- ◆ Establish the basis for enabling the scalability of such solutions
- ◆ 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.



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

03

# Course Management

This Postgraduate Diploma in *Blockchain* and Digital Twins has a team of highly qualified engineers 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 engineers, experts in the most advanced and most applicable technologies of the present and the future. In this way, a horizon of professional growth will open up for them.



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*Renowned professionals will guide you to be empowered to lead the global digitization process and become a major player in the process"*

## Management



### Mr. Molina Molina, Jerónimo

- ◆ He is currently leading several relevant projects in the field of Artificial Intelligence.
- ◆ AI Engineer & Software Architect. NASSAT - Internet Satellite in Motion
- ◆ Sr. Consultant at Hexa Ingenieros
- ◆ Expert in Artificial Intelligence based solutions.
- ◆ He is currently leading several relevant projects in the field of Artificial Intelligence.
- ◆ Computer Engineer (Alicante University)
- ◆ Expert in Business Creation and Development (Bancaixa - FUNDEUN Alicante)
- ◆ Computer Engineer (Alicante University)
- ◆ Executive MBA (European Business Campus Forum)
- ◆ Master in Artificial Intelligence (Avila Catholic University)

## Professors

### Mr. Mostajo Fernández, Iván

- ◆ Technical Engineer in Computer Systems Engineering (Alcalá de Henares University)
- ◆ ISBAN Consultant (Santander Consumer Finance Spain)
- ◆ Technical Project Manager at Infortec Ingeniería
- ◆ Technical Consultant at Signum Software and Eutropraxis -Petrobrass
- ◆ Wozala - Advisor and Back-End Architect
- ◆ He has managed projects using Agile Methodologies. Scrum; NET Framework/Core; Design Patterns; UML; Database Analysis and Design
- ◆ Wozala - Advisor and Back-End Architect

### Mr. Díaz Morales, Ángel

- ◆ Bachelor in Computer Science at Wales University (Cardiff)
- ◆ Scrum Master PSI (Scrum.org)
- ◆ TILv3 Foundation Certification
- ◆ AJAX; C# 2.0; Sharepoint 3.0; ITIL; JBoss and J2EE Teacher
- ◆ CTO at Wozala
- ◆ Leader Cetelem-DevOps & Integration Dpt

### Mr. Villalba García, Alfredo

- ◆ Professor of Domotics at CEDOM
- ◆ Design Engineer at ITT Standard Electric and ALCATEL
- ◆ Industrial Engineer from the School of Industrial Engineering of the Polytechnic University of Madrid.
- ◆ Specialist in Robotics and Automation
- ◆ Master's Degree in Retail Technology
- ◆ Master's Degree in Industrial Automation
- ◆ Master's Degree in Domotics and Inmotics
- ◆ Ph.D. in Computer Science from the University of Fontainebleau
- ◆ CEO and Founding Partner of INMOMATICA and CQUENT

# 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 and with supporting material, oriented to experienced engineers 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 Basis
  - 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. Supervision 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
    - 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: NFT
  - 1.8.5. Tokenization: STO

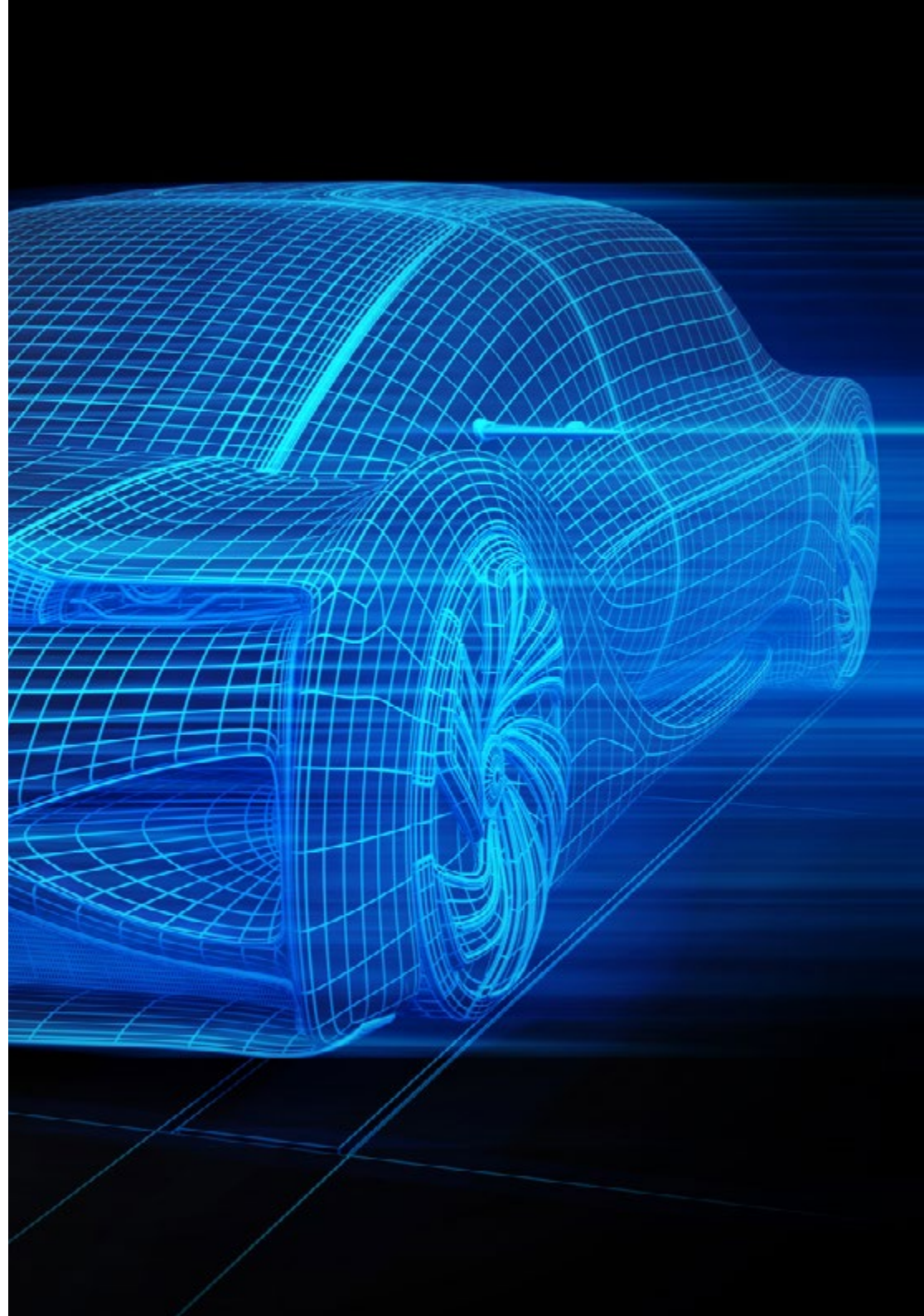
- 1.9. *Blockchain*. Examples of Use
  - 1.9.1. Use Case Description
  - 1.9.2. Practical Implementation (C#/Go)
- 1.10. Distributed Data. *Blockchain* Applications. Present and Future
  - 1.10.1. Distributed Data. Present and Future Applications of *Blockchain*
  - 1.10.2. The Future of Communication
  - 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. Datum Security
  - 2.3.2. Security and Privacy
  - 2.3.3. Use Cases and Application
- 2.4. Data Quality
  - 2.4.1. Datum 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 Application
  - 2.10.1. *Blockchain* in Practice
    - 2.10.1.1. Data Centers
    - 2.10.1.2. Sectorial
    - 2.10.1.3. Multisectorial
    - 2.10.1.4. Geographical

### Module 3. Digital Twins Innovative Solutions

- 3.1. Digital Twins
  - 3.1.1. Digital Twins
  - 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 Applications. 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



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- 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 Results in Present and Future
    - 3.10.1. Platform
    - 3.10.2. Technologies
    - 3.10.3. Sectors

“After successfully completing this program, you will have the ability 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: ***Re-learning***.

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 Re-learning, 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"*

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

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



*We are the first online university to combine Harvard Business School case studies with a 100% online learning system based on repetition.*





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

This intensive Engineering program at TECH Global University prepares you to face all the challenges in this field, both nationally and internationally. We are committed to promoting your personal and professional growth, the best way to strive for success, that is why at TECH Global University you will use Harvard *case studies*, with which we have a strategic agreement that allows us, to offer you material from the best university in the world.

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

The case method is the most widely used learning system by the best faculties in the world. 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 program, the studies 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.

## Re-learning Methodology

TECH is the first university in the world to combine Harvard University case studies with a 100% online learning system based on repetition, which combines 8 different didactic elements in each lesson.

We enhance Harvard case studies with the best 100% online teaching method: Re-learning.

*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 Re-learning.

Our university is the only university 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.

*Re-learning 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 competencies and skills in each thematic area. Exercises and activities to acquire and develop the skills and abilities that a specialist needs to develop in the context of the globalization we live in.



### 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**

They will complete a selection of the best case studies in the field used at Harvard. Cases that are presented, analyzed, and supervised by the best senior management 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 multimedia content presentation training Exclusive system 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 your 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 training program  
and receive your university certificate  
without travel or 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.



future

health confidence people

education information tutors

guarantee accreditation teaching

institutions technology learning

community commitment

**tech** global  
university

personalized service innovation

knowledge present quality  
online training

development language

virtual classroom

## Postgraduate Diploma Blockchain and Digital Twins

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