

# Postgraduate Certificate

## Business Blockchain Development: Hyperledger Besu



## Postgraduate Certificate Business Blockchain Development: Hyperledger Besu

- » Modality: online
- » Duration: 6 weeks
- » Certificate: TECH Technological University
- » Schedule: at your own pace
- » Exams: online
- » Target Group: computer engineers, programmers, and others in the digital field. As well as managers interested in implementing Blockchain technology in their companies and people interested in Blockchain technology.

Website: [www.techtute.com/in/school-of-business/postgraduate-certificate/business-blockchain-development-hyperledger-besu](http://www.techtute.com/in/school-of-business/postgraduate-certificate/business-blockchain-development-hyperledger-besu)

# Index

01

Welcome

---

*p. 4*

02

Why Study at TECH?

---

*p. 6*

03

Why Our Program?

---

*p. 10*

04

Objectives

---

*p. 14*

05

Structure and Content

---

*p. 18*

06

Methodology

---

*p. 24*

07

Student Profile

---

*p. 32*

08

Course Management

---

*p. 36*

09

Impact on Your Career

---

*p. 40*

10

Benefits for Your Company

---

*p. 44*

11

Certificate

---

*p. 48*

# 01

# Welcome

Hyperledger Besu has become one of the main tools for working on Blockchain projects. Probably because of the high standards of privacy it offers. However, its use presents certain difficulties and the speed at which Blockchain technology is advancing requires constant updating in terms of the knowledge possessed. In this sense, the program proposed by TECH is in line with the requirements of the current market. Offering theoretical and practical knowledge about Hyperledger Besu. All this, through an 100% online modality and without schedules, that the student can organize themselves according to their needs.



Postgraduate Certificate in Business Blockchain Development: Hyperledger Besu.  
TECH Technological University





“

*TECH faculty will delve into the benefits of working on Hyperledger Besu with Open Ethereum”*

02

# Why Study at TECH?

TECH is the world's largest 100% online business school. It is an elite business school, with a model based on the highest academic standards. A world-class centre for intensive managerial skills training.



“

*TECH is a university at the forefront of technology, and puts all its resources at the student's disposal to help them achieve entrepreneurial success"*

## At TECH Technological University



### Innovation

The university offers an online learning model that combines the latest educational technology with the most rigorous teaching methods. A unique method with the highest international recognition that will provide students with the keys to develop in a rapidly-evolving world, where innovation must be every entrepreneur's focus.

"Microsoft Europe Success Story", for integrating the innovative, interactive multi-video system.



### The Highest Standards

Admissions criteria at TECH are not economic. Students don't need to make a large investment to study at this university. However, in order to obtain a qualification from TECH, the student's intelligence and ability will be tested to their limits. The institution's academic standards are exceptionally high...

**95%** | of TECH students successfully complete their studies



### Networking

Professionals from countries all over the world attend TECH, allowing students to establish a large network of contacts that may prove useful to them in the future.

**100,000+**  
executives trained each year

**200+**  
different nationalities



### Empowerment

Students will grow hand in hand with the best companies and highly regarded and influential professionals. TECH has developed strategic partnerships and a valuable network of contacts with major economic players in 7 continents.

**500+** | collaborative agreements with leading companies



### Talent

This program is a unique initiative to allow students to showcase their talent in the business world. An opportunity that will allow them to voice their concerns and share their business vision.

After completing this program, TECH helps students show the world their talent.



### Multicultural Context

While studying at TECH, students will enjoy a unique experience. Study in a multicultural context. In a program with a global vision, through which students can learn about the operating methods in different parts of the world, and gather the latest information that best adapts to their business idea.

TECH students represent more than 200 different nationalities.





TECH strives for excellence and, to this end, boasts a series of characteristics that make this university unique:



### Learn with the best

---

In the classroom, TECH's teaching staff discuss how they have achieved success in their companies, working in a real, lively, and dynamic context. Teachers who are fully committed to offering a quality specialization that will allow students to advance in their career and stand out in the business world.

Teachers representing 20 different nationalities.



*At TECH, you will have access to the most rigorous and up-to-date case studies in the academic community"*



### Analysis

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TECH explores the student's critical side, their ability to question things, their problem-solving skills, as well as their interpersonal skills.



### Academic Excellence

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TECH offers students the best online learning methodology. The university combines the Relearning method (a postgraduate learning methodology with the highest international rating) with the Case Study. A complex balance between tradition and state-of-the-art, within the context of the most demanding academic itinerary.



### Economy of Scale

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TECH is the world's largest online university. It currently boasts a portfolio of more than 10,000 university postgraduate programs. And in today's new economy, **volume + technology = a groundbreaking price**. This way, TECH ensures that studying is not as expensive for students as it would be at another university.

03

# Why Our Program?

Studying this TECH program means increasing the chances of achieving professional success in senior business management.

It is a challenge that demands effort and dedication, but it opens the door to a promising future. Students will learn from the best teaching staff and with the most flexible and innovative educational methodology.



“

*We have highly qualified teachers and the most complete syllabus on the market, which allows us to offer you training of the highest academic level"*

This program will provide students with a multitude of professional and personal advantages, particularly the following:

**01**

### A significant career boost

By studying at TECH, students will be able to take control of their future and develop their full potential. By completing this program, students will acquire the skills required to make a positive change in their career in a short period of time.

*70% of participants achieve positive career development in less than 2 years.*

**02**

### Develop a strategic and global vision of companies

TECH offers an in-depth overview of general management to understand how each decision affects each of the company's different functional areas.

*Our global vision of companies will improve your strategic vision.*

**03**

### Consolidate the student's senior management skills

Studying at TECH means opening the doors to a wide range of professional opportunities for students to position themselves as senior executives, with a broad vision of the international environment.

*You will work on more than 100 real senior management cases.*

**04**

### Take on new responsibilities

The program will cover the latest trends, advances and strategies, so that students can carry out their professional work in a changing environment.

*45% of graduates are promoted internally.*

05

### Access to a powerful network of contacts

TECH connects its students to maximize opportunities. Students with the same concerns and desire to grow. Therefore, partnerships, customers or suppliers can be shared.

*You will find a network of contacts that will be instrumental for professional development.*

06

### Thoroughly develop business projects

Students will acquire a deep strategic vision that will help them develop their own project, taking into account the different areas in companies.

*20% of our students develop their own business idea.*

07

### Improve soft skills and management skills

TECH helps students apply and develop the knowledge they have acquired, while improving their interpersonal skills in order to become leaders who make a difference.

*Improve your communication and leadership skills and enhance your career.*

08

### Be part of an exclusive community

Students will be part of a community of elite executives, large companies, renowned institutions, and qualified professors from the most prestigious universities in the world: the TECH Technological University community.

*We give you the opportunity to train with a team of world renowned teachers.*

# 04 Objectives

This program is specifically designed for its graduates to apply the Hyperledger Besu tool in their companies. It delves into configuration, interoperability, deployment and installation of Plugins, among other contents.





“

*Through this program, you will learn how to work with key configuration parameters for PoA and PoW”*

TECH makes the goals of their students their own goals too.  
Working together to achieve them.

The Postgraduate Certificate in Business Blockchain Development: Hyperledger Besu qualifies students to:

01

Develop design criteria for applications on production Hyperledger Besu clients

04

Integrate existing knowledge in the student in a refined way based on the needs of the industry and the company. With its notions of quality, effort measurement and development valuation, expanding your value as a Blockchain application developer

02

Provide a foundation in the management and configuration of Hyperledger Besu-based networks

05

Identify key configuration points in the consensus protocols available with Hyperledger Besu

03

Promote best practices when developing applications with dependency on Blockchain networks, particularly those based on Ethereum and on Hyperledger Besu client

06

Right size a Hyperledger Besu service to support enterprise applications

07

Develop automated test protocols for quality validation in Hyperledger Besu environments

10

Determining the sizing criteria for an application with Hyperledger Besu

08

Establish safety criteria for a production environment with Hyperledger Besu

11

Strengthen knowledge of the functioning of the consensus mechanisms implemented in Hyperledger Besu

09

Compile different types of configurations on Hyperledger Besu clients

12

Define the most interesting technological Stack in the implementation of infrastructure and development of applications based on Hyperledger Besu

05

# Structure and Content

The Postgraduate Certificate in Business Blockchain Development: Hyperledger Besu is taught fully online and without timetables. So, students can choose the time and place that best suits their availability and interests. A program that takes place over 6 weeks and a 24 hour a day available syllabus that aims to be a unique and stimulating experience to sow the foundations for professional success.



“

*You will have access to the virtual classroom 24 hours a day, with total freedom to delve into topics such as securitization through node schemes”*

## Syllabus

The Postgraduate Certificate in Business Blockchain Development. Hyperledger Besu from TECH Technological University is an intensive program that prepares its students to implement public Blockchains in the business environment.

The program content is designed to promote the development of managerial skills, aimed at making decisions with rigor in a rapidly advancing technological ecosystem.

Over 150 hours in length, students will analyze a multitude of practical cases through individual and teamwork. It is, therefore, a real immersion in the world of Blockchain, and more specifically, in working with Hyperledger Besu.

The syllabus delves into concepts such as Finetuning, securitization, transaction balancers or Offchain tools, among others. As well as the applications developed by Besu, their deployment and automation. Therefore, a Postgraduate Certificate that allows its graduates to implement this new technology in their businesses from a strategic perspective.

The plan focuses on professional improvement to achieve excellence in personal and business management. Understanding the current company needs and, consequently, proposing innovative content. Moreover, the program is supported by an exceptional educational methodology and teaching staff that generate creative and efficient skills.

This Postgraduate Certificate takes place over six week and has 1 module:

### Module 1.

### Business Blockchain Development: Hyperledger Besu





### Where, When and How is it Taught?

TECH offers the possibility of developing this Postgraduate Certificate in Business Blockchain Development: Hyperledger Besu completely online. Over the course of 6 weeks, you will be able to access all the contents of this program at any time, allowing you to self-manage your study time.

*A unique, key, and decisive educational experience to boost your professional development and make the definitive leap.*

Module 1. Business Blockchain Development: Hyperledger Besu

1.1. Besu Configuration

- 1.1.1. Key Configuration Parameters in Production Environments
- 1.1.2. Finetuning for Connected Services
- 1.1.3. Good Configuration Practices

1.2. Blockchain Configuration

- 1.2.1. Key Configuration Parameters for PoA
- 1.2.2. Key Configuration Parameters for PoW
- 1.2.3. Genesis Block Configurations

1.3. Securing Besu

- 1.3.1. RPC Securitization with TLS
- 1.3.2. RPC Securitization with NGINX
- 1.3.3. Securitization by Means of a Node Scheme

1.4. Besu in High Availability

- 1.4.1. Node Redundancy
- 1.4.2. Balancers for Transactions
- 1.4.3. Transaction Pool on Messaging Queue

1.5. Offchain Tools

- 1.5.1. Privacy. Tessera
- 1.5.2. Identity. Alastria ID
- 1.5.3. Data Indexing. Subgraph

1.6. Applications Developed on Besu

- 1.6.1. ERC20 Token-Based Applications
- 1.6.2. ERC 721 Tokens-Based Applications
- 1.6.3. ERC 1155 Tokens-Based Applications

1.7. Besu Deployment and Automation

- 1.7.1. Besu over Docker
- 1.7.2. Besu over Kubernetes
- 1.7.3. Besu in Blockchain as a Service

1.8. Besu Interoperability with Other Clients

- 1.8.1. Interoperability with Geth
- 1.8.2. Interoperability with *Open Ethereum*
- 1.8.3. Interoperability with Other DLTs

1.9. Plugins for Besu

- 1.9.1. Most Common Plugins
- 1.9.2. Plugin Development
- 1.9.3. Installation of Plugins

1.10. Configuration of Development Environments

- 1.10.1. Creation of a Developing Environment
- 1.10.2. Creation of a Customer Integration Environment
- 1.10.3. Creating a Pre-Production Environment for Load Testing



*Enroll in this Postgraduate Certificate and start working in your company with the security criteria of a productive environment in Hyperledger Besu"*





# 06

# 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"*



## TECH Business School uses the 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”*



*This program prepares you to face business challenges in uncertain environments and achieve business success.*





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

## A learning method that is different and innovative

This TECH program is an intensive educational program, created from scratch to present executives with challenges and business decisions at the highest level, whether at the national or international level. 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 business reality is taken into account.

**“** *You will learn, through collaborative activities and real cases, how to solve complex situations in real business environments”*

The case method has been the most widely used learning system among the world's leading business 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 we face in the case method, an action-oriented learning method. Throughout the program, the studies will be presented with multiple real cases. They must integrate all their knowledge, research, 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.

*Our online system will allow you to organize your time and learning pace, adapting it to your schedule. You will be able to access the contents from any device with an internet connection.*

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 online business school is the only one in the world licensed to incorporate 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.

With this methodology we have 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, markets, and financial 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 specialization, developing a critical mindset, defending arguments, and contrasting opinions: a direct equation to 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.



### Management Skills Exercises

They will carry out activities to develop specific executive competencies in each thematic area. Practices and dynamics to acquire and develop the skills and abilities that a high-level manager 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

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 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 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.



07

# Student Profile

The Postgraduate Certificate is intended for computer engineers, programmers and others in the digital field. As well as managers interested in implementing Blockchain technology at their companies and people interested in Blockchain technology.







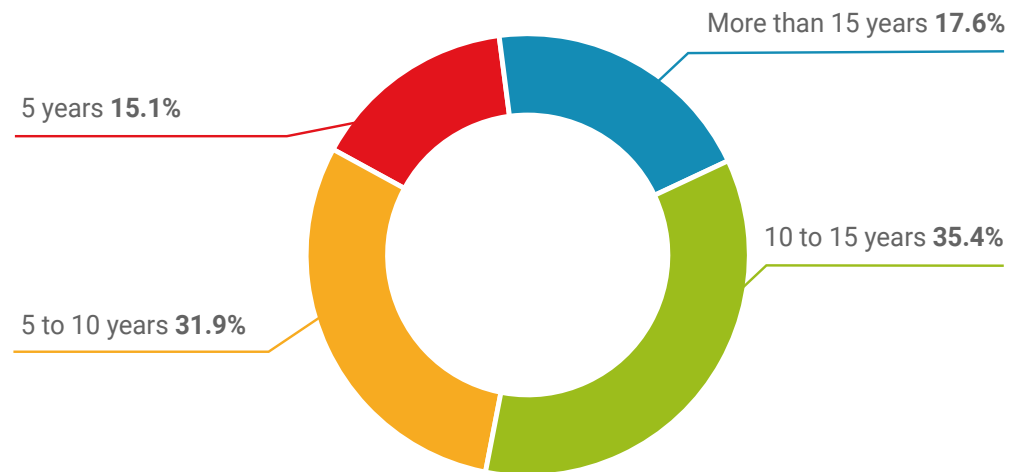
“

*The TECH teaching faculty will define best practices when setting up Hyperledger Besu so that the application in your business is hassle-free"*

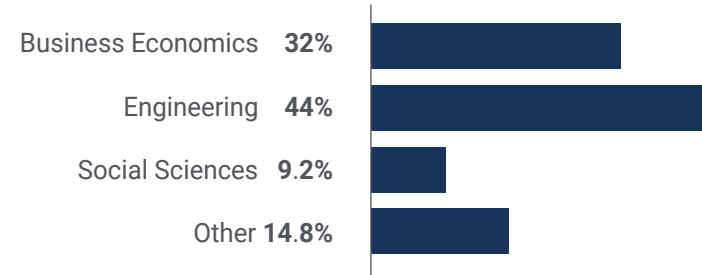
### Average Age

Between **35** and **45** years old

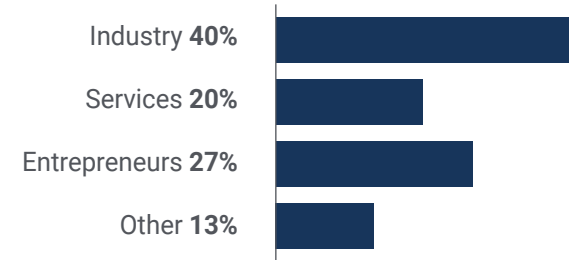
### Years of Experience



### Training

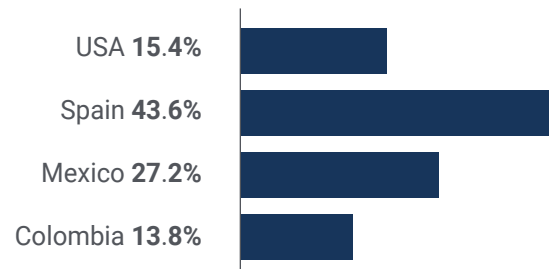


### Academic Profile



## Geographical Distribution

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## Gerardo Pérez Pérez

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Computer Engineer

*"I couldn't be more grateful to TECH. The truth is that my expectations were not so high. However, the work with the teachers has been magnificent. They have accompanied me throughout the learning process and have given me very useful advice. Even my bosses have been surprised by the fluency I've gained working with Hyperledger Besu"*

08

# Course Management

The teaching staff of this Postgraduate Certificate is composed of active *Blockchain* technology experts who will share with their students all the essentials needed in this field, so that they can later apply them in their own companies. In this way, it is guaranteed that everything they learn in this program has a practical application that will substantially improve the future prospects of their companies.

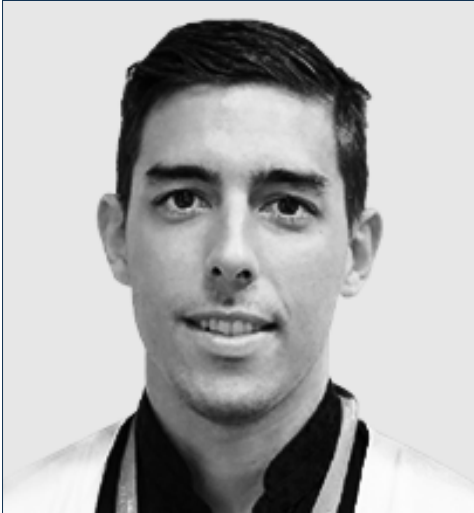


“

*The leading experts in Programming for Blockchain have come together to offer you a high-level qualification that will be fundamental to your professional development in the field”*



## Management



### Mr. Torres Palomino, Sergio

- ♦ IT Engineer with expertise in Blockchain
- ♦ Blockchain Lead at Telefónica
- ♦ Blockchain Architect at Signeblock
- ♦ Blockchain Developer at Blocknitive
- ♦ Writer and disseminator at O'Really Media Books
- ♦ Lecturer in graduate studies and Blockchain related courses
- ♦ Degree in Computer Engineering from San Pablo CEU University
- ♦ Master's Degree in Big Data Architecture
- ♦ Master's Degree in Big Data and Business Analytics

## Professors

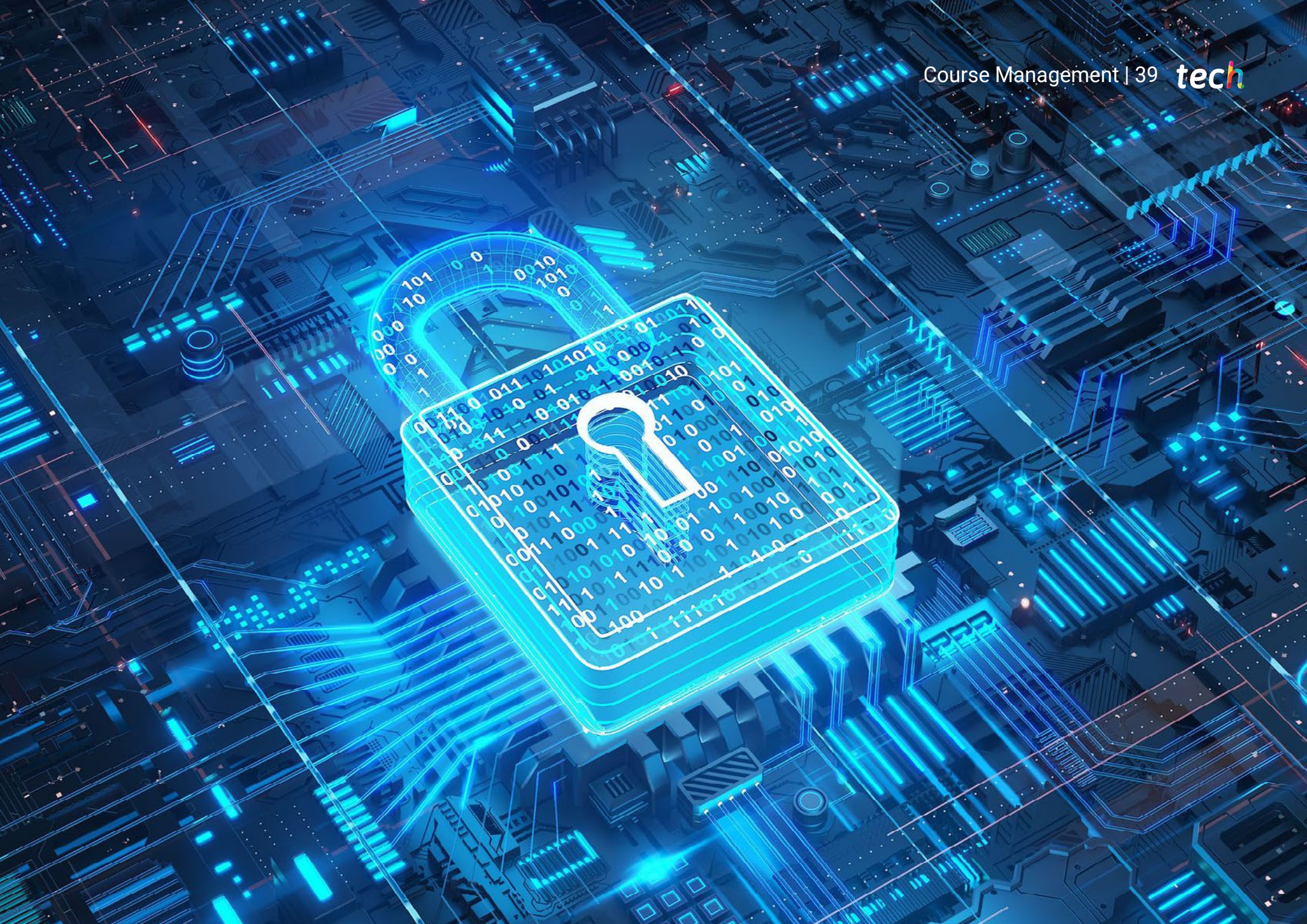
### Mr. García de la Mata, Íñigo

- ♦ Senior Manager and Software Architect of the Innovation Team at Grant Thornton
- ♦ Blockchain Engineer at Alastria Blockchain Ecosystem
- ♦ Lecturer in Blockchain University courses at UNIR
- ♦ Lecturer and Blockchain Bootcamp and Geekshub
- ♦ Consultant at Ascendo Consulting Healthcare & Pharma
- ♦ Engineer at ARTECHE
- ♦ Bachelor's Degree in Industrial Engineering with a Major in Electronics
- ♦ Master's Degree in Electronics and Control from Comillas Pontifical University
- ♦ Degree in Computer Engineering from the Spanish Open University (UNED)
- ♦ TFG tutoring at Comillas Pontifical University

### Mr. Triguero Tirado, Enrique

- ♦ Blockchain Infrastructure Technical Manager at UPC-Threepoints
- ♦ Chief Technical Officer at Ilusiak
- ♦ Project Management Officer at Ilusiak and Deloitte
- ♦ ELK Engineer at Everis
- ♦ Systems Architect at Everis
- ♦ Degree in Technical Engineering in Computer Systems at the Polytechnic University of Valencia
- ♦ Master's Degree in Blockchain and its Business Applications from ThreePoints and the Polytechnic University of Valencia







09

# Impact on Your Career

The program proposed by TECH delves into the business possibilities offered by the Hyperledger Besu tool. Their use will help automate processes in a multitude of areas, directly increasing productivity and generating competitive advantages.



“

*The digital ecosystem is continuously advancing, don't be left behind and start using Hyperledger Besu in your company"*

### Are you ready to take the leap? Excellent professional development awaits you

The Postgraduate Certificate in Business Blockchain Development: Hyperledger Besu is an intensive program that prepares its graduates to face challenges and business decisions in the field of *Blockchain* technology. Its primary objective is to promote personal and business growth by helping you achieve success.

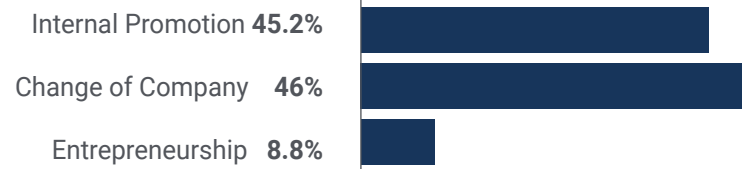
*Start automating processes now by applying Blockchain technology. At TECH, we show you all its keys.*

*Learn about the peculiarities of interoperability with Geth through our program so that you can take full advantage of the possibilities offered by Hyperledger Besu.*

#### When the change occurs



#### Type of change





## Salary increase

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The completion of this program represents a salary increase of more than **26.2%** for our students.



10

# Benefits for Your Company

The Postgraduate Certificate in Business Blockchain Development: Hyperledger Besu helps elevate the organization's talent to its full potential through targeted learning for senior leaders.

Applying knowledge in terms of Blockchain, and more specifically in the use of Hyperledger Besu, will help boost business capabilities. And, therefore, it will allow students to face the needs of a changing market.



“

*At TECH, we put at your disposal teachers who are currently working on private Blockchain projects and who can give you very useful advice"*

Developing and retaining talent in companies is the best long-term investment.

01

### **Intellectual Capital and Talent Growth**

The professional will introduce the company to new concepts, strategies, and perspectives that can bring about significant changes in the organization.

---

02

### **Retaining high-potential executives to avoid talent drain**

This program strengthens the link between the company and the professional and opens new avenues for professional growth within the company.

03

### **Building agents of change**

You will be able to make decisions in times of uncertainty and crisis, helping the organization overcome obstacles.

---

04

### **Increased international expansion possibilities**

Thanks to this program, the company will come into contact with the main markets in the world economy.



05

### **Project Development**

The professional can work on a real project or develop new projects in the field of R&D or Business Development of your company.

---

06

### **Increased competitiveness**

This Postgraduate Certificate will equip your professionals with the skills to take on new challenges and therefore drive the organization forward.



11

# Certificate

The Postgraduate Certificate in Business Blockchain Development: Hyperledger Besu 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 Business Blockchain Development: Hyperledger Besu** 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 diploma 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 Business Blockchain Development: Hyperledger Besu**

Official N° of Hours: **150 h.**



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



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