

# Postgraduate Certificate Distributed Computing Systems



## Postgraduate Certificate Distributed Computing Systems

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

Website: [www.techtitute.com/us/information-technology/postgraduate-certificate/distributed-computing-systems](http://www.techtitute.com/us/information-technology/postgraduate-certificate/distributed-computing-systems)

# Index

01

Introduction

---

*p. 4*

02

Objectives

---

*p. 8*

03

Course Management

---

*p. 12*

04

Structure and Content

---

*p. 16*

05

Methodology

---

*p. 20*

06

Certificate

---

*p. 28*

# 01

# Introduction

Distributed Computing Systems have revolutionized the way we understand and use many of today's applications and services. Numerous programs that make use of artificial intelligence systems, as well as the concept of *Big Data* itself, would not make sense without an effective development of the distributed systems that support them. Computer scientists with a seasoned knowledge in this area have an indisputable professional value, so specializing in it is a great choice to continue climbing up the career ladder to more prestigious and important positions and projects. This Postgraduate Certificate contains the keys and competencies that the computer scientist must develop to become an expert in Distributed Computing Systems, as numerous experts and engineers have compiled the most valuable knowledge in a convenient, accessible, no-strings-attached format.



“

*Boost your IT career by delving into networking and interconnection of distributed networks, design of distributed systems and security approaches in these systems"*

Inter-process communication, cryptographic security and distributed transactions have evolved at an astonishing pace in recent years. Data replication and remote invocation of services has triggered the emergence of commercially successful projects such as Netflix, which require the best IT to maintain their complex distribution systems.

The computing area of Distributed Computing Systems is only growing with the proliferation of larger devices and 5G networks, which enable higher processing power and speeds than even those achieved by large computers. It is a technological revolution in which the computer scientist plays an active part, so it is essential that they refine their skills in the design and programming of these systems to take full advantage of their potential.

Thanks to this Diploma, developed by a teaching staff with extensive professional experience in companies and projects of great prestige, the computer scientist will be able to learn the most important considerations and keys regarding Distributed Computing Systems. The eminently practical approach of all the contents makes them useful, even as reference material afterwards, resulting in an enriching academic experience for the student.

The fully online format of this Postgraduate Certificate also ensures that it can be combined with all kinds of professional and personal responsibilities. All the contents are accessible from the first day, and the student can download and study them at their own pace.

This **Postgraduate Certificate in Distributed Computing Systems** contains the most comprehensive and up-to-date scientific program on the market. The most important features include:

- ◆ The development of case studies presented by experts in Parallel and Distributed Computing
- ◆ The graphic, schematic, and eminently practical contents with which they are created, provide 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 for experts and individual reflection work
- ◆ Content that is accessible from any fixed or portable device with an Internet connection



*You will have the freedom to decide how to distribute the teaching load, with no fixed schedules or face-to-face classes to limit you"*

“

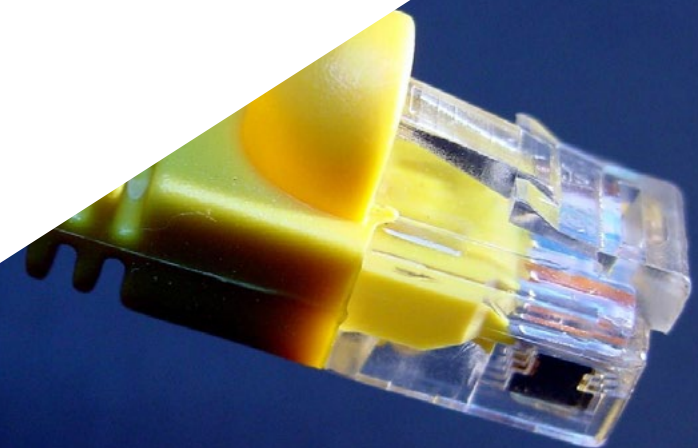
*You will access an agenda rich in details about Distributed Computing Systems, including the operation of distributed systems, replication of such systems and multimedia success stories such as Netflix or Spotify”*

*Enroll now in the Postgraduate Certificate that will make a difference in your professional career, demonstrating your high skills and versatility in the management of different distributed systems.*

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 the professional with situated and contextual learning, i.e., a simulated environment that will provide immersive training programmed to train 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.



# 02 Objectives

The main objective of this degree is to offer an exhaustive, integral and decisive vision in the computational area of Distributed Systems. As a result, the computer scientist will develop more sophisticated skills and work methodology when creating or analyzing these kinds of systems. It is, therefore, a great way to consolidate and improve one's knowledge, while achieving a significant job improvement.





“

*You will more than meet your most ambitious career goals, specializing in an IT field that demands engineers prepared to meet security and distributed architecture challenges”*



## General Objectives

---

- ◆ Develop the key elements of a Distributed System
- ◆ Examine the security elements applied in Distributed Systems and their necessity
- ◆ Present the different types of Distributed Systems most commonly used, their characteristics, functionalities and the problems to be solved
- ◆ Demonstrate the CAP Theorem applicable to Distributed Systems: *Consistency* , *Availability* and *Partition Tolerance*



*You will be able to make a considerable quality leap in your work with distributed systems, understanding more in depth their operation and characteristics"*





## Specific Objectives

---

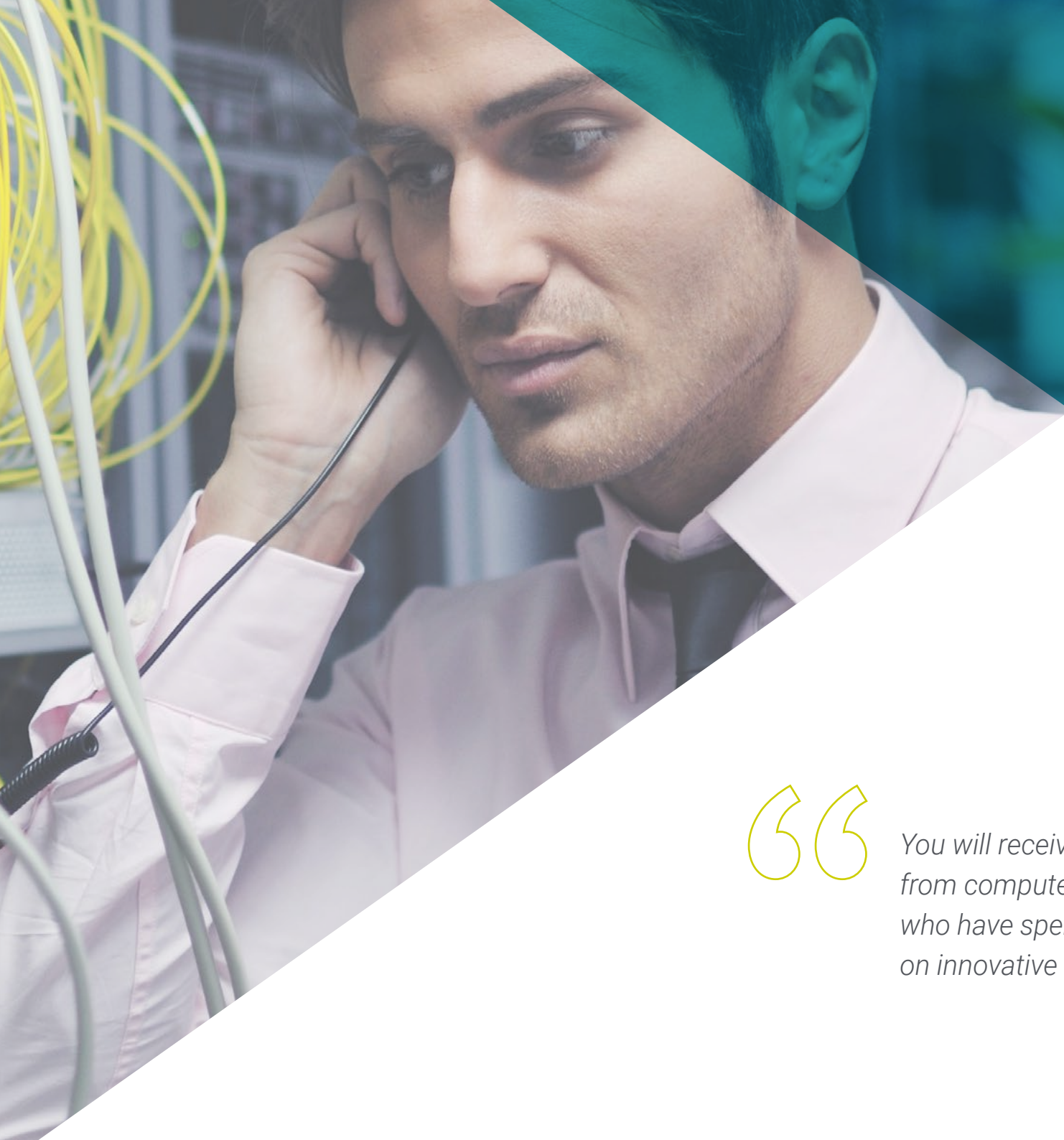
- ◆ Analyze the characteristics of a distributed system and associated problems
- ◆ Evaluate the challenges for which the Distributed Systems were designed
- ◆ Identify the elements that allow the interconnection of distributed networks
- ◆ Fundamentals of Distributed System Design Steps
- ◆ Evaluate the different types of data replication in existing systems
- ◆ Examine in detail the Distributed Multimedia Systems in the face of the evolution of the content culture
- ◆ Compile applicable practical security approaches

# 03

# Course Management

The teaching team in charge of this degree has been assembled by TECH given its extensive experience in the development and creation of Distributed Computing Systems of all kinds. The content of the program combines all the expertise of the faculty with the latest technological and theoretical advances in the field of parallel computing, which guarantees its quality and suitability for the most advanced computing environments.





“

*You will receive the best practical advice from computer scientists and engineers who have spent their entire careers working on innovative and complex projects"*

## Management



### Mr. Olalla Bonal, Martín

- Technical Sales Blockchain Specialist in IBM
- Blockchain Hyperledger and Ethereum Architecture Manager at Blocknitive
- Director of the Blockchain area at PSS Information Technologies
- Chief Information Officer in ePETID – Global Animal Health
- IT Infrastructure Architect at Bankia - wdoIT (IBM - Bankia Join Venture)
- Project Director and Manager in Daynet Servicios Integrales
- Director of Technology at Wiron Construcciones Modulares
- Head of IT Department at Dayfisa
- Head of IT Department at Dell Computer, Majsia and Hippo Viajes
- Electronics Technician in IPFP Juan de la Cierva



## Professors

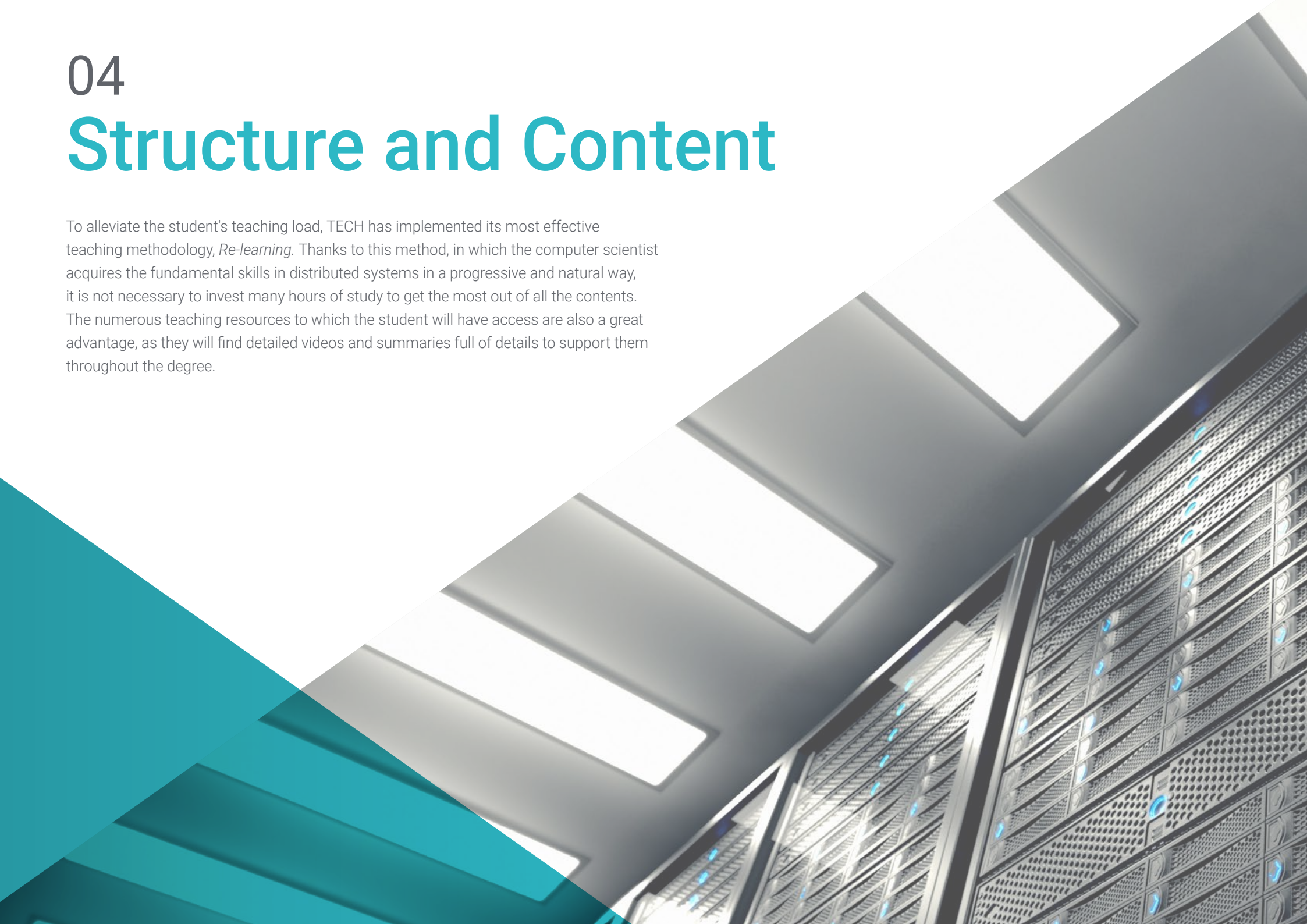
### Mr. Gozalo Fernández, Juan Luis

- ◆ Computer Engineer
- ◆ Associate Professor in DevOps and Blockchain at UNIR
- ◆ Former manager of Blockchain DevOps in Alastria
- ◆ Tinkerlink Mobile Application Development Manager at Cronos Telecom
- ◆ IT Director at Banco Santander
- ◆ IT Service Management Technology Director at Barclays Bank Spain
- ◆ Degree in Computer Engineering from UNED

# 04

# Structure and Content

To alleviate the student's teaching load, TECH has implemented its most effective teaching methodology, *Re-learning*. Thanks to this method, in which the computer scientist acquires the fundamental skills in distributed systems in a progressive and natural way, it is not necessary to invest many hours of study to get the most out of all the contents. The numerous teaching resources to which the student will have access are also a great advantage, as they will find detailed videos and summaries full of details to support them throughout the degree.






“

*The virtual classroom will be available  
24 hours a day with all content available  
whenever you choose to study it"*

## Module 1. Distributed Computing Systems

- 1.1. Distributed Systems
  - 1.1.1. Distributed Systems (DS)
  - 1.1.2. Proof of CAP Theorem (or Brewer's Conjecture)
  - 1.1.3. Distributed Systems Programming Fallacies
  - 1.1.4. Ubiquitous Computing
- 1.2. Distributed Systems Features
  - 1.2.1. Heterogeneity
  - 1.2.2. Extensibility
  - 1.2.3. Security/Safety
  - 1.2.4. Scales
  - 1.2.5. Fault Tolerance
  - 1.2.6. Concurrency
  - 1.2.7. Transparency
- 1.3. Networks and Interconnection of Distributed Networks
  - 1.3.1. Networks and Distributed Systems Network Performance
  - 1.3.2. Available Networks to Create a Distributed System Typology
  - 1.3.3. Distributed vs. Centralized Protocols
  - 1.3.4. Network Interconnection Internet
- 1.4. Communication between Distributed Processes
  - 1.4.1. Communication between Nodes of an SD Problems and Faults
  - 1.4.2. Mechanisms to Implement on RPC and RDMA to Avoid Failures
  - 1.4.3. Mechanisms to Be Implemented in the Software to Avoid Failures
- 1.5. Design of Distributed Systems
  - 1.5.1. Efficient Design of Distributed Systems (DS)
  - 1.5.2. Patterns for Programming in Distributed Systems (DS)
  - 1.5.3. *Service Oriented Architecture (SOA)*
  - 1.5.4. *Service Orchestration and Microservices Data Management*



- 
- 1.6. Operation of Distributed Systems
    - 1.6.1. System Operations Monitoring
    - 1.6.2. Implementation of an Efficient *Logging* System in a SD
    - 1.6.3. Distributed Network Monitoring
    - 1.6.4. Use of a Monitoring Tool for an SD: Prometheus and Grafana
  - 1.7. System Replication
    - 1.7.1. System Replication Typologies
    - 1.7.2. Immutable Architectures
    - 1.7.3. Container Systems and Virtualizing Systems as Distributed Systems
    - 1.7.4. *Blockchain* Networks as Distributed Systems
  - 1.8. Multimedia Distributed Systems
    - 1.8.1. Distributed Exchange of Images and Videos Problem
    - 1.8.2. Multimedia Object Servers
    - 1.8.3. Network Topology for a Multimedia System
    - 1.8.4. Analysis of Distributed Multimedia Systems: Netflix, Amazon, Spotify, etc
    - 1.8.5. Distributed Multimedia Systems in Education
  - 1.9. Distributed File Systems
    - 1.9.1. Distributed File Exchange Problem
    - 1.9.2. Applicability of the CAP Theorem to Databases
    - 1.9.3. Web Distributed File Systems: Akamai
    - 1.9.4. IPFS Distributed Documentary File Systems
    - 1.9.5. Distributed Database Systems
  - 1.10. Security Approaches in Distributed Systems
    - 1.10.1. Security in Distributed Systems
    - 1.10.2. Known Attacks on Distributed Systems
    - 1.10.3. Tools to Test the Security of a DS

# 05 Methodology

This training program offers 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"*

## At TECH we use the Case Method

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.

“

*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.*



### A learning method that is different and innovative.

This intensive Information Technology program at TECH Technological 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 Technological 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 student 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 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.

## Re-learning Methodology

Our university is the first in the world to combine Harvard University case studies with a 100%-online learning system based on repetition, which combines different teaching 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 Certificate in Distributed Computing Systems, in addition to the most rigorous and up-to-date training, access to a Postgraduate Certificate issued by TECH Technological University.



“

*Successfully complete this training and receive your university degree without travel or laborious paperwork”*

This **Postgraduate Certificate in Distributed Computing Systems** contains the most complete and update program on the market.

After the student has passed the evaluations, they will receive their corresponding **Postgraduate Certificate** by **TECH Technological University** by tracked delivery\*

The diploma issued by **TECH Technological University** will reflect the qualification obtained through the Postgraduate Certificate, and meets the requirements commonly demanded by job markets, competitive examinations, and professional career evaluation committees.

Title: **Postgraduate Certificate in Distributed Computing Systems**

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.

future  
health confidence people  
education information tutors  
guarantee accreditation teaching  
institutions technology learning  
community commitment  
personalized service in  
knowledge present quality  
development languages  
classroom



## Postgraduate Certificate Distributed Computing Systems

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

# Postgraduate Certificate Distributed Computing Systems

