

# Postgraduate Diploma Information Use in Data Science



## Postgraduate Diploma Information Use in Data Science

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

Website: [www.techtute.com/us/information-technology/postgraduate-diploma/postgraduate-diploma-information-use-data-science](http://www.techtute.com/us/information-technology/postgraduate-diploma/postgraduate-diploma-information-use-data-science)

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# 01

# Introduction

In the world today, the concept of Data Science is developed around a set of techniques, technologies and tools capable of analyzing, synthesizing and extracting knowledge hidden in data. For this reason, to perform a proper extraction process, computer engineers must be familiar with the necessary fundamentals for information management and manipulation. The program will provide students with the opportunity to examine data management tools through programming languages. An opportunity complimented by technological reference architecture for network connectivity, which will constitute a friendlier ecosystem for company employees.





“

*Establish the conditions that must be met and replicated to optimize data utilization and quality”*

This Postgraduate Diploma will lay the foundations of knowledge computer engineers must have when managing data structures, focusing on typology and life cycle. For this reason, valuable statistical information will be provided, fundamental to better understand the process of extraction, analysis and synthesis.

It is also necessary to establish the importance of new technologies such as IoT, Internet of Things. Such technologies have been revolutionary in their ability to convert simple and inert objects into objects that interact and connect to the Internet. That is how they have become a technological solution for companies seeking to create an ecosystem that enables industrial solutions.

Finally, the technologies and tools on the market will be addressed, examining the principles of the most important components in a system designed to meet the challenge of big data. At the end of the program, engineers will be equipped with specialized knowledge of the different possibilities when designing distributed systems, the advantages and penalties involved in choosing tools or technologies over others, which requires understanding their components.

All of the above is complemented by a 100% online program, which can be studied at our students' convenience, wherever and whenever it suits them. All you need is a device with Internet access to take your career one step further. A modality in accord with the current times and all the guarantees to position engineers in a highly demanded field.

This **Postgraduate Diploma in Information Use in Data Science** contains the most complete and up-to-date academic program on the market.

The most important features of the program include:

- ◆ Practical cases studies are presented by experts in Engineering in data analysis
- ◆ The graphic, schematic, and eminently practical contents with which they are created, provide scientific 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
- ◆ Access to content from any fixed or portable device with an Internet connection



*Establish the conditions that must be met and replicated to optimize data utilization and quality"*

“

*Develop partitioning methods and distributed transactions with a program that will enhance your professional aptitude”*

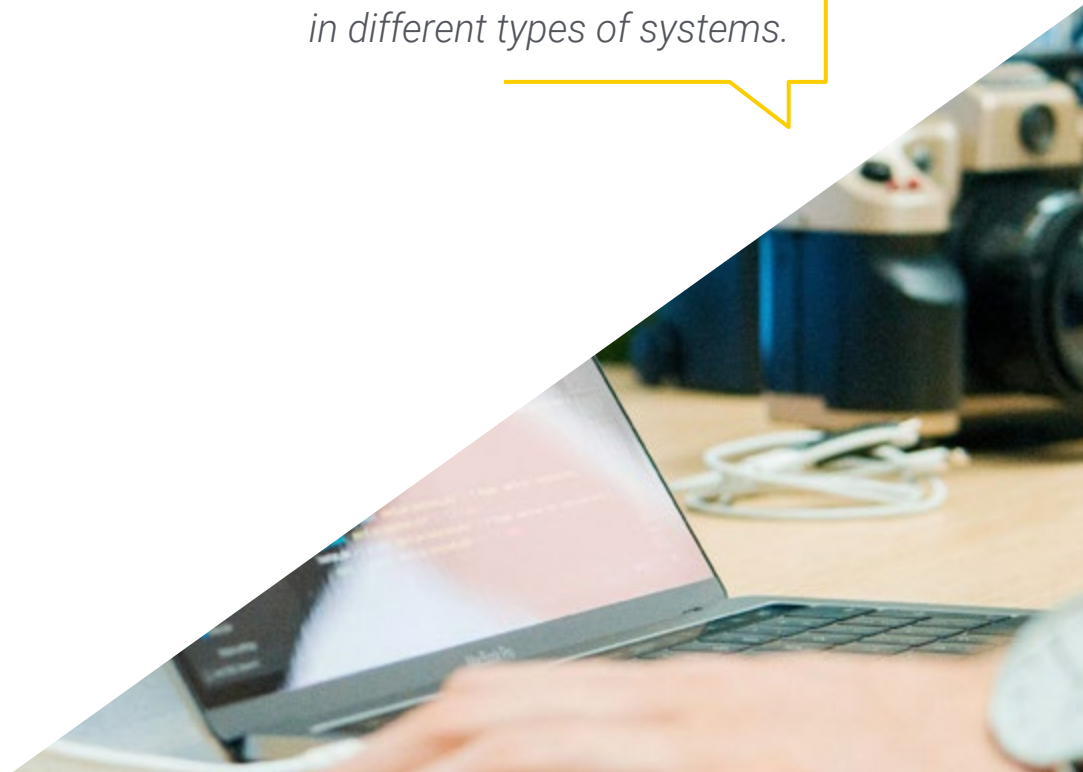
The program's teaching staff includes professionals from sector who contribute their work experience to this training program, as well as renowned specialists from leading societies and prestigious universities.

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. This will be done with the help of an innovative, interactive video system developed by renowned experts with extensive personal training experience.

*Examine the different IoT Cloud platforms: General purpose, industrial, open source.*

*Analyze the key functionalities for distributed systems and their importance in different types of systems.*



# 02 Objectives

This Postgraduate Diploma is the best option for computer engineers who wish to specialize in Data Science information use. Students will be presented with a series of general and specific objectives that will guide their learning at all times, allowing them to determine the best practices for data management according to typology and use. And they will thus be able to take the knowledge acquired in the program to their work practice.







“

*Develop your skills with a Postgraduate Diploma focused on enhancing your professional profile in determining the requirements of a massive data usage system”*



## General Objectives

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- ◆ Analyze the benefits of applying data analytic techniques in every company department
- ◆ Develop the basis for understanding the needs and applications of each department
- ◆ Generate specialized knowledge to select the right tool
- ◆ Propose techniques and objectives in order to be as productive as possible according to the department





## Specific Objectives

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### Module 1. Data and Information Management and Manipulation in Data Science

- ◆ Perform data analyses
- ◆ Unify diverse data: Achieving consistency of information
- ◆ Produce relevant, effective information to aid decision-making
- ◆ Determine the best practices for data management according to typology and use
- ◆ Establish data access and reuse policies
- ◆ Ensure security and availability: information availability, integrity and confidentiality
- ◆ Examine data management tools using programming languages

### Module 2. Devices and IoT platforms as a base for Data Science

- ◆ Define what is meant by IoT (Internet of Things) and IIoT (Industrial Internet of Things)
- ◆ Review the Industrial Internet Consortium
- ◆ Analyze what the IoT reference architecture is
- ◆ Address IoT sensors and devices and their classification
- ◆ Identify the communications protocols and technologies used in IoT
- ◆ Examine the different IoT Cloud platforms: general purpose, industrial, open source
- ◆ Develop data exchange mechanisms
- ◆ Establish security requirements and strategies
- ◆ Present the different IoT and IIoT application areas

### Module 3. Architecture and Systems for Intensive Use of Data

- ◆ Determine the requirements for mass data usage systems
- ◆ Examine different data models and analyze databases
- ◆ Analyze the key functionalities for distributed systems and their importance in different types of systems
- ◆ Evaluate which among the widely used applications use the fundamentals of distributed systems to design their systems
- ◆ Analyze how databases store and retrieve information
- ◆ Understand the different replication models and associated issues
- ◆ Develop partitioning and distributed transactions
- ◆ Assess batch systems and (near) real time systems



*This program the perfect opportunity to grow professionally in a field of great international demand”*

03

# Course Management

The teaching team on this Postgraduate Diploma program has multiple years of experience in the field, in addition to extensive academic training, which enables them to prepare students in this highly demanded field today. Likewise, their purpose is to provide dynamic learning through practical cases, facilitating the understanding of the concepts presented.



“

*Learn from the best and take  
your career to the next level”*

## Management



### Dr. Peralta Martín-Palomino, Arturo

- CEO and CTO at Prometheus Global Solutions
- CTO at Korporate Technologies
- CTO in AI Shephers GmbH
- Doctorate in Psychology from the University of CastillaLa
- PhD in Economics, Business and Finance from the Camilo José Cela University. Outstanding Award in her PhD
- PhD in Psychology, University of CastillaLa Mancha
- Master's Degree in Advanced Information Technologies from the University of Castilla la Mancha
- Master MBA+E (Master's Degree in Business Administration and Organisational Engineering) from the University of Castilla la Mancha
- Associate lecturer, teaching undergraduate and master's degrees in Computer Engineering at the University of Castilla la Mancha
- Professor of the Master in Big Data and Data Science at the International University of Valencia
- Lecturer of the Master's Degree in Industry 4.0 and the Master's Degree in Industrial Design and Product Development
- Member of the SMILe Research Group of the University of Castilla la Mancha

## Professors

### Ms. Fernández Meléndez, Galina

- ◆ Data Analyst in ADN Mobile Solution
- ◆ ETL processes, data mining, data analysis and visualization, establishment of KPI's, Dashboard design and implementation, management control R development, SQL management, among others
- ◆ Pattern determination, predictive modeling, machine learning
- ◆ Bachelor's degree in Business Administration Bicentennial de Aragua-Caracas University
- ◆ Diploma in Planning and Public Finance Venezuelan School of Planning, School of Finance
- ◆ Professional Master's Degree in Data Analysis and Business Intelligence. University of Oviedo
- ◆ MBA in Business Administration and Management (Escuela De Negocios Europea De Barcelona)
- ◆ Master in Big Data and Business Intelligence (Escuela de Negocios Europea de Barcelona)

### Mr. Peris Morillo, Luis Javier

- ◆ Technical Lead in Capítolo Consulting He leads a team at Inditex in the logistics unit of its open platform
- ◆ Senior Technical Lead y Delivery Lead Support en HCL
- ◆ Agile Coach and Director of Operations at Mirai Advisory
- ◆ Member of the Steering Committee as Chief Operating Officer
- ◆ Developer, Team Lead, Scrum Master, Agile Coach, Product Manager in DocPath
- ◆ Higher Engineering in Computer Science by the ESI of Ciudad Real (UCLM)
- ◆ Postgraduate in Project Management by CEOE - Confederación Española de Organizaciones Empresariales (Spanish Confederation of Business Organisations)
- ◆ 50+ MOOCs taken, taught by renowned universities such as Stanford University, Michigan University, Yonsei University, Polytechnic University of Madrid, etc
- ◆ Several certifications, some of the most notable or recent ones are Azure Fundamentals

### Mr. Tato Sánchez, Rafael

- ◆ Project Management INDRA SISTEMAS S.A
- ◆ Technical Director INDRA SISTEMAS S.A
- ◆ Systems Engineer ENA TRÁFICO S.A.U
- ◆ IFCD048PO. Software Project Management and Development Methodology with SCRUM
- ◆ Coursera: Machine Learning
- ◆ Udemy: Deep Learning A-Z. Hands-on Artificial Neural Networks
- ◆ Coursera: IBM: Fundamentals of Scalable Data Science
- ◆ Coursera: IBM: Applied AI with Deep Learning
- ◆ Coursera: IBM: Advance Machine Learning and Signal Processing
- ◆ Degree in Industrial Electronics and Automation Engineering from the European University of Madrid
- ◆ Master's Degree in Industrial Engineering from the European University of Madrid
- ◆ Master's Degree in Industry 4.0 by the International University of La Rioja (UNIR)
- ◆ Professional certification. SSCE0110. Teaching for vocational training for employment
- ◆ Professional certification. SSCE0110. Teaching for vocational training for employment
- ◆ Master's Degree in Industry 4.0 by the International University of La Rioja (UNIR)

# 04

## Structure and Content

This Postgraduate Diploma is designed to ensure computer engineers interested in this field of action reach excellence. Thus, at the end of each module, students will have optimally developed their skills in terms of data analysis and processing, as well as in identifying the protocols and communication technologies used in IoT.





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*Evaluate which widely used applications implement distributed systems fundamentals to design their systems”*

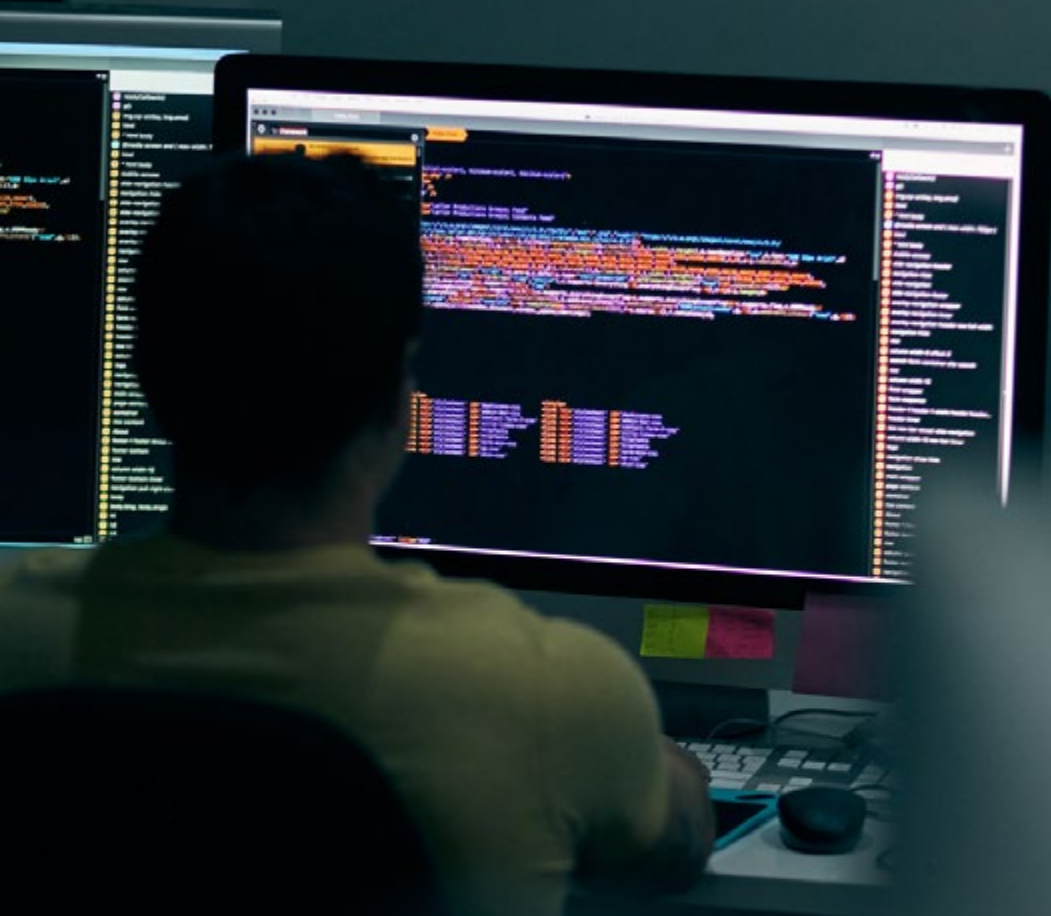
## Module 1. Data Management, Data Manipulation and Information Management for Data Science

- 1.1. Statistics: Variables, Indexes and Ratios
  - 1.1.1. Statistics
  - 1.1.2. Statistical Dimensions
  - 1.1.3. Variables, Indexes and Ratios
- 1.2. Type of Data
  - 1.2.1. Qualitative
  - 1.2.2. Quantitative
  - 1.2.3. Characterization and Categories
- 1.3. Data Knowledge from the Measurements
  - 1.3.1. Centralization Measurements
  - 1.3.2. Measures of Dispersion
  - 1.3.3. Correlation
- 1.4. Data Knowledge from the Graphs
  - 1.4.1. Visualization According to Type of Data
  - 1.4.2. Interpretation of Graphic Information
  - 1.4.3. Customization of graphics with R
- 1.5. Probability
  - 1.5.1. Probability
  - 1.5.2. Function of Probability
  - 1.5.3. Distributions
- 1.6. Data Collection
  - 1.6.1. Methodology of Data Collection
  - 1.6.2. Data Collection Tools
  - 1.6.3. Data Collection Channels
- 1.7. Data Cleaning
  - 1.7.1. Phases of Data Cleansing
  - 1.7.2. Data Quality
  - 1.7.3. Data Manipulation (with R)

- 1.8. Data Analysis, Interpretation and Evaluation of Results
  - 1.8.1. Statistical Measures
  - 1.8.2. Relationship Indices
  - 1.8.3. Data Mining
- 1.9. *Data Warehouse*
  - 1.9.1. Components
  - 1.9.2. Design
- 1.10. Data Availability
  - 1.10.1. Access
  - 1.10.2. Uses
  - 1.10.3. Security

## Module 2. Devices and IoT Platforms as a Base for Data Science

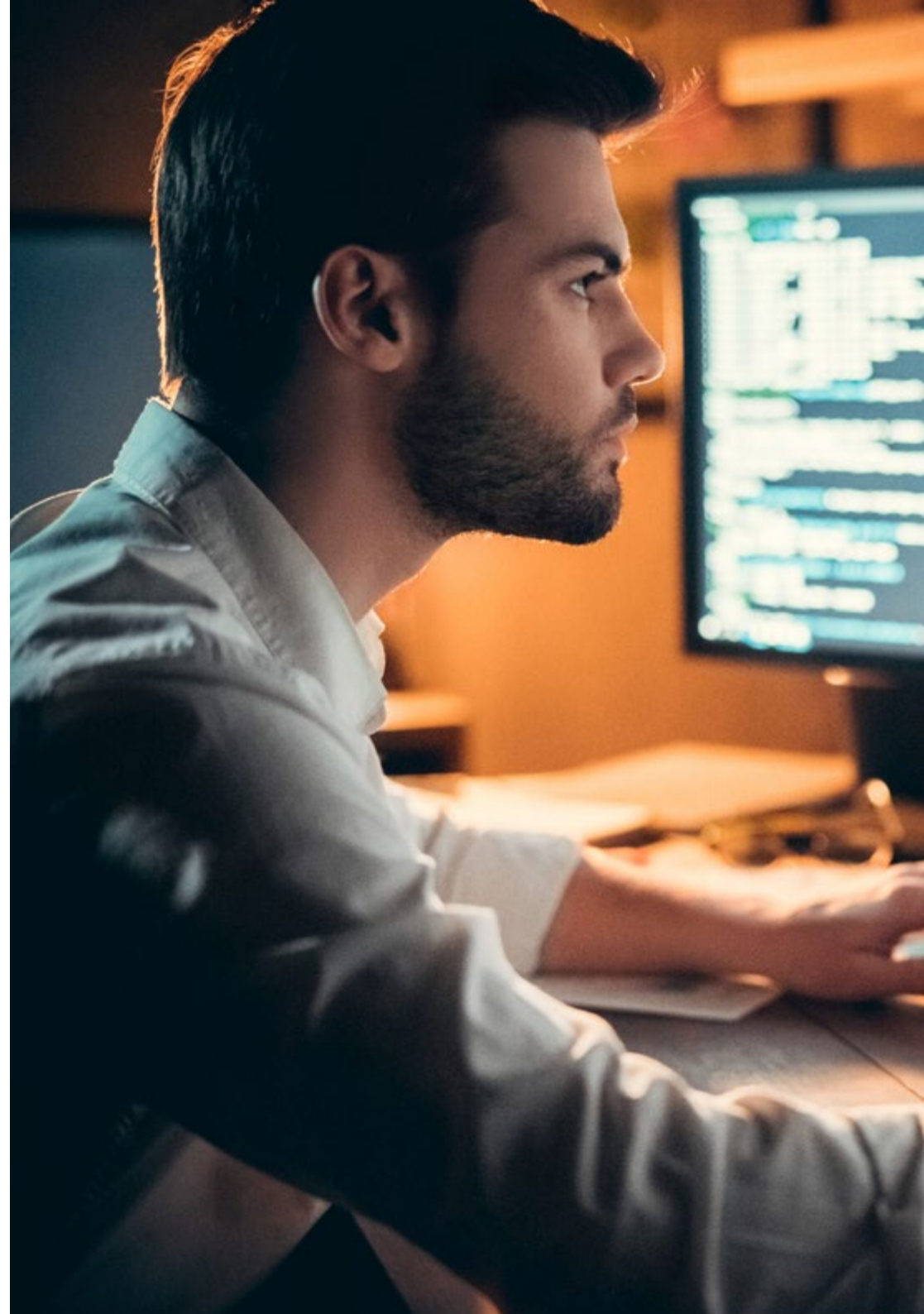
- 2.1. The Internet of Things
  - 2.1.1. The Internet of the Future, Internet of Things
  - 2.1.2. The Industrial Internet Consortium
- 2.2. Architecture of Reference
  - 2.2.1. The Architecture of Reference
  - 2.2.2. Layers
  - 2.2.3. Components
- 2.3. Sensors and IoT Devices
  - 2.3.1. Principal Components
  - 2.3.2. Sensors and Actuators
- 2.4. Communications and Protocols
  - 2.4.1. Protocols. OSI Model
  - 2.4.2. Communication Technologies
- 2.5. Cloud Platforms for IoT and IioT
  - 2.5.1. General Purpose Platforms
  - 2.5.2. Industrial Platforms
  - 2.5.3. Open Code Platforms



- 2.6. Data Management on IoT Platforms
  - 2.6.1. Data Management Mechanisms. Open Data
  - 2.6.2. Data Exchange and Visualization
- 2.7. IoT Security
  - 2.7.1. Requirements and Security Areas
  - 2.7.2. Security Strategies in IoT
- 2.8. Applications of IoT
  - 2.8.1. Intelligent Cities
  - 2.8.2. Health and Fitness
  - 2.8.3. Smart Home
  - 2.8.4. Other Applications
- 2.9. Applications of IoT
  - 2.9.1. Fabrication
  - 2.9.2. Transport
  - 2.9.3. Energy
  - 2.9.4. Agriculture and Livestock
  - 2.9.5. Other Sectors
- 2.10. Industry 4.0
  - 2.10.1. IoRT (Internet of Robotics Things)
  - 2.10.2. 3D Additive Manufacturing
  - 2.10.3. Big Data Analytics

### Module 3. Architecture and Systems for Intensive Use of Data

- 3.1. Non-Functional Requirements. Pillars of Big Data Applications
  - 3.1.1. Reliability
  - 3.1.2. Adaptation
  - 3.1.3. Maintainability
- 3.2. Data Models
  - 3.2.1. Relational Model
  - 3.2.2. Document Model
  - 3.2.3. Graph Type Data Model
- 3.3. Databases. Storage Management and Data Recovery
  - 3.3.1. Hash Indexes
  - 3.3.2. Structured Log Storage
  - 3.3.3. Trees B
- 3.4. Data Coding Formats
  - 3.4.1. Language-Specific Formats
  - 3.4.2. Standardized Formats
  - 3.4.3. Binary Coding Formats
  - 3.4.4. Data Stream Between Processes
- 3.5. Replication
  - 3.5.1. Objectives of Replication
  - 3.5.2. Replication Models
  - 3.5.3. Problems with Replication
- 3.6. Distributed Transactions
  - 3.6.1. Transaction
  - 3.6.2. Protocols for Distributed Transactions
  - 3.6.3. Serializable Transactions





- 3.7. Partitions
  - 3.7.1. Forms of Partitioning
  - 3.7.2. Secondary Index Interaction and Partitioning
  - 3.7.3. Partition Rebalancing
- 3.8. Offline Data Processing
  - 3.8.1. Batch Processing
  - 3.8.2. Distributed File Systems
  - 3.8.3. MapReduce
- 3.9. Data Processing in Real Time
  - 3.9.1. Types of Message Broker
  - 3.9.2. Representation of Databases as Data Streams
  - 3.9.3. Data Stream Processing
- 3.10. Practical Applications in Business
  - 3.10.1. Consistency in Readings
  - 3.10.2. Holistic Focus of Data
  - 3.10.3. Scaling of a Distributed Service

“Determine mass data usage system requirements with a program that will lead you to professional excellence”

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.*





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

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.



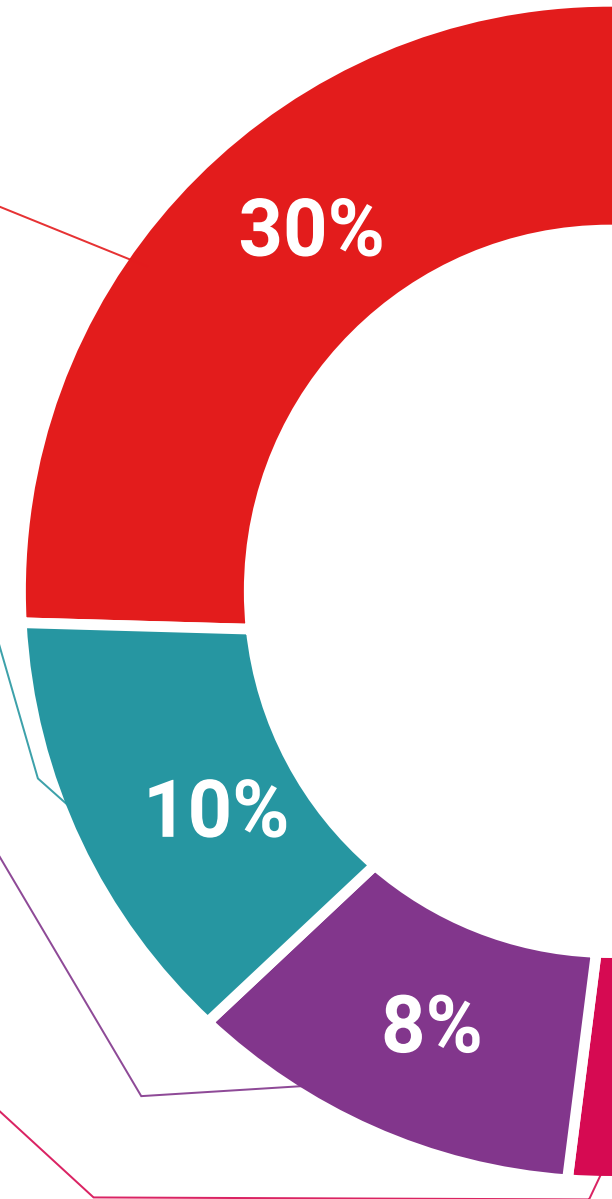
### Practising Skills and Abilities

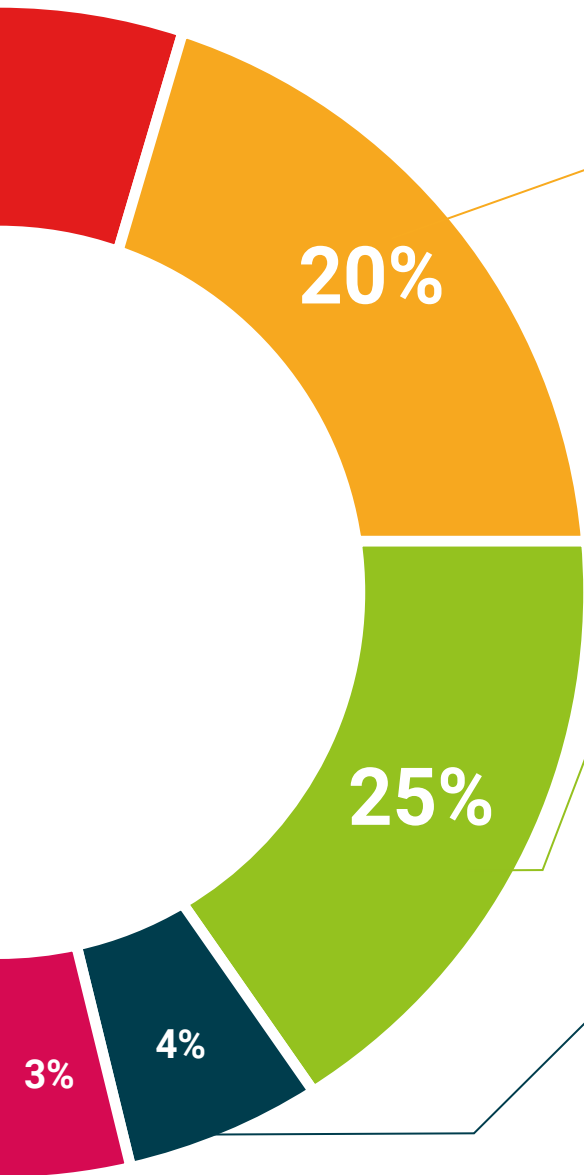
They will carry out activities to develop specific skills and abilities in each subject area. Exercises and activities to acquire and develop the skills and abilities that a specialist needs to develop in the context of the globalization that we are experiencing.



### 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 Information Use in Data Science guarantees students, in addition to the most rigorous and up-to-date education, access to a Postgraduate Diploma issued by TECH Technological University.



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*Successfully complete this program and receive your university qualification without having to travel or fill out laborious paperwork”*

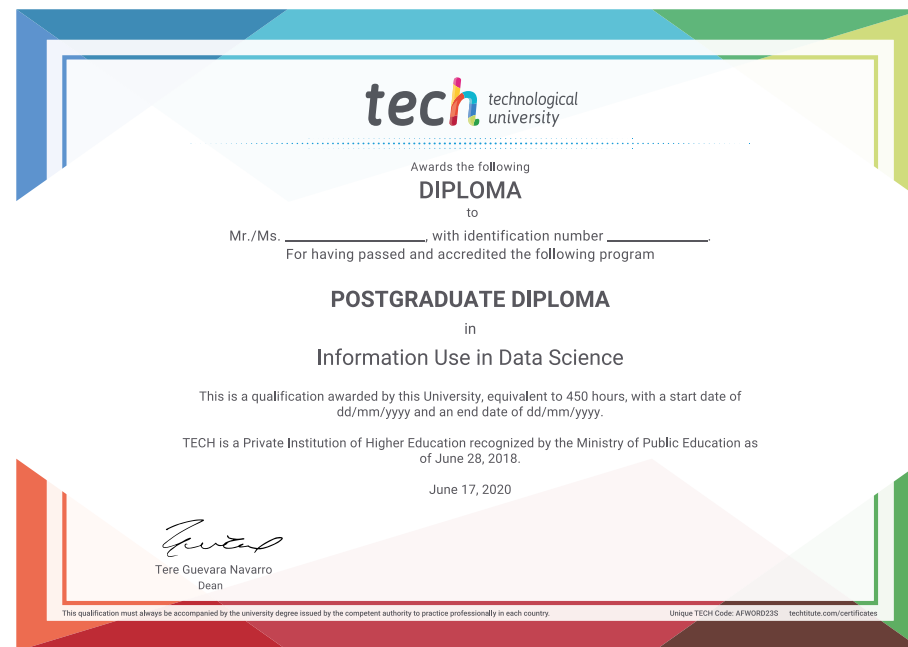
This **Postgraduate Diploma in Information Use in Data Science** contains the most complete and up-to-date program the market.

After the student has passed the assessments, they will receive their corresponding **Postgraduate Diploma** issued by **TECH Technological University** via tracked delivery\*.

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

Title: **Postgraduate Diploma in Information Use in Data Science**

Official Number of Hours: **450 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.



health future  
confidence people  
education information tutors  
guarantee accreditation teaching  
institutions technology learning  
community commitment  
personalized service innovation  
knowledge present  
online training  
development language  
classroom



## Postgraduate Diploma Information Use in Data Science

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

# Postgraduate Diploma Information Use in Data Science

