

# Postgraduate Diploma Automation and Artificial Intelligence



## Postgraduate Diploma Automation and Artificial Intelligence

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

Website: [www.techtute.com/us/artificial-intelligence/postgraduate-diploma/postgraduate-diploma-automation-artificial-intelligence](http://www.techtute.com/us/artificial-intelligence/postgraduate-diploma/postgraduate-diploma-automation-artificial-intelligence)

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# 01

# Introduction

Within the framework of Artificial Intelligence, Big Data is consolidating its position as one of the tools most widely used by institutions to detect anomalous patterns. For example, banks use their systems to certify that financial transactions are carried out optimally, thus avoiding fraud. In this way, big data allows companies to collect and analyze large volumes of information. This enables professionals to make more informed decisions to ensure the viability of their various procedures. However, to benefit from these elements, specialists need to update their knowledge on a regular basis to incorporate the latest trends in this field into their practice. For this reason, TECH creates a digital program that will delve into Machine Learning.







*With this Postgraduate Diploma, you will have the most advanced techniques of Natural Language Processing to design Virtual Assistants"*

Automation systems are becoming increasingly important within organizations. These technologies are designed to improve aspects such as efficiency, productivity and flexibility of industrial operations. In this way, a new highly demanded professional profile has emerged, consisting in the specialization of Artificial Intelligence. To take advantage of this job opportunity and gain a competitive advantage, experts must obtain a solid knowledge of Industry 4.0. In tune with this, they need to acquire new skills to effectively handle advanced machinery such as robotics, sensors or standardized fieldbuses.

To respond to this demand, TECH is developing an innovative program that will deal in detail with Automation Systems corresponding to the Fourth Industrial Revolution. Designed by experts in this field, the curriculum will delve into the Programmable Logic Controller, following the evolution of programming languages. In this regard, the syllabus will provide students with predictive maintenance techniques, which will be useful for applying algorithms to prevent potential equipment failures before they occur. In addition, the program will highlight the importance of data ingest systems to efficiently store, organize and manage large volumes of information.

It should be noted that the curriculum will use an innovative 100% online methodology: Relearning. This method of teaching allows the acquisition of updated skills through the gradual and periodic reiteration of the most complex concepts of this syllabus. Likewise, students who choose this Postgraduate Diploma for its updating will not have to worry about hermetic schedules. On the contrary, they have the possibility of individually planning both their access to the contents and the evaluation schedules. They will also be exempt from unnecessary travel to an on-site center and will be able to specialize from anywhere in the world.

This **Postgraduate Diploma in Automation and Artificial Intelligence** contains the most complete and up-to-date program on the market. The most important features include:

- The development of case studies presented by experts in AI and technological solutions
- The graphic, schematic, and 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 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 use Data Mining to segment customers and offer customized products that meet their demands"*

“

*You will apply Lean Manufacturing to industrial processes to improve labor efficiency and optimize consistency in production”*

*Position yourself in the labor market with a 100% online program that adapts to your needs and allows you a solid learning”*

*Thanks to TECH's Relearning system, you will acquire the concepts in a natural way and without the need to memorize.*

The program's teaching staff includes professionals from the sector who contribute their work experience to this 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 education programmed to learn 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 students will be assisted by an innovative interactive video system created by renowned and experienced experts.





# 02

# Objectives

Thanks to this Postgraduate Diploma, graduates will acquire a deep understanding of Automation and Artificial Intelligence techniques. Upon completion of the program, students will have enriched their professional practice with new skills that will contribute to problem solving and the implementation of cutting-edge solutions. Professionals will be empowered to lead the digitalization plans of any company, while successfully overcoming obstacles that arise during the course of their regular work.





“

*Take a step forward in your professional career with this high-level program, through only 450 teaching hours"*



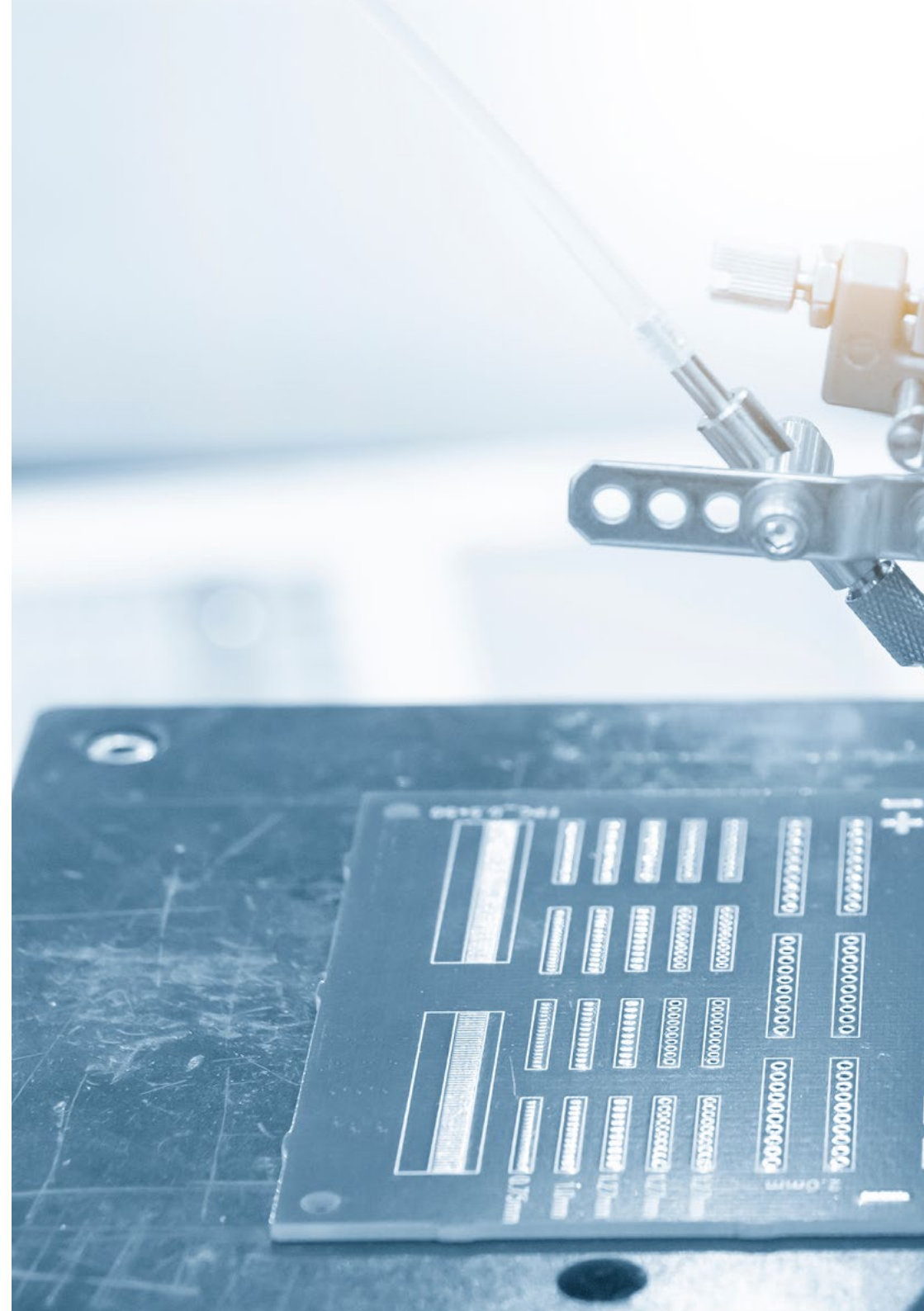
## General Objectives

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- Conduct a comprehensive analysis of the profound transformation and radical paradigm shift being experienced in the current global digitalization process
- Provide in-depth knowledge and the necessary technological tools to face and lead the technological leap and the challenges currently present in companies
- Master the digitalization procedures of companies and the automation of their processes to create new fields of wealth in areas such as creativity, innovation and technological efficiency1
- Leading Digital Change



*You will optimize your updating process by means of innovative multimedia didactic formats, including interactive summaries of the syllabus"*







## Specific Objectives

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### Module 1. Industry 4.0 Automation Systems

- ◆ Conduct an exhaustive analysis of the practical application that emerging technologies are having in the different economic sectors and in the value chain of their main industries
- ◆ In-depth knowledge of the primary and secondary economic sectors, as well as the technological impact they are experiencing

### Module 2. Big Data and Artificial Intelligence

- ◆ Delve into the knowledge of the fundamental principles of artificial intelligence
- ◆ Master the techniques and tools of this technology (machine learning/deep learning)
- ◆ Obtain a practical knowledge of one of the most widespread applications such as Chatbots and virtual assistants
- ◆ Acquire knowledge of the different transversal applications that this technology has in all fields

### Module 3. Robotics, Drones and Augmented Workers

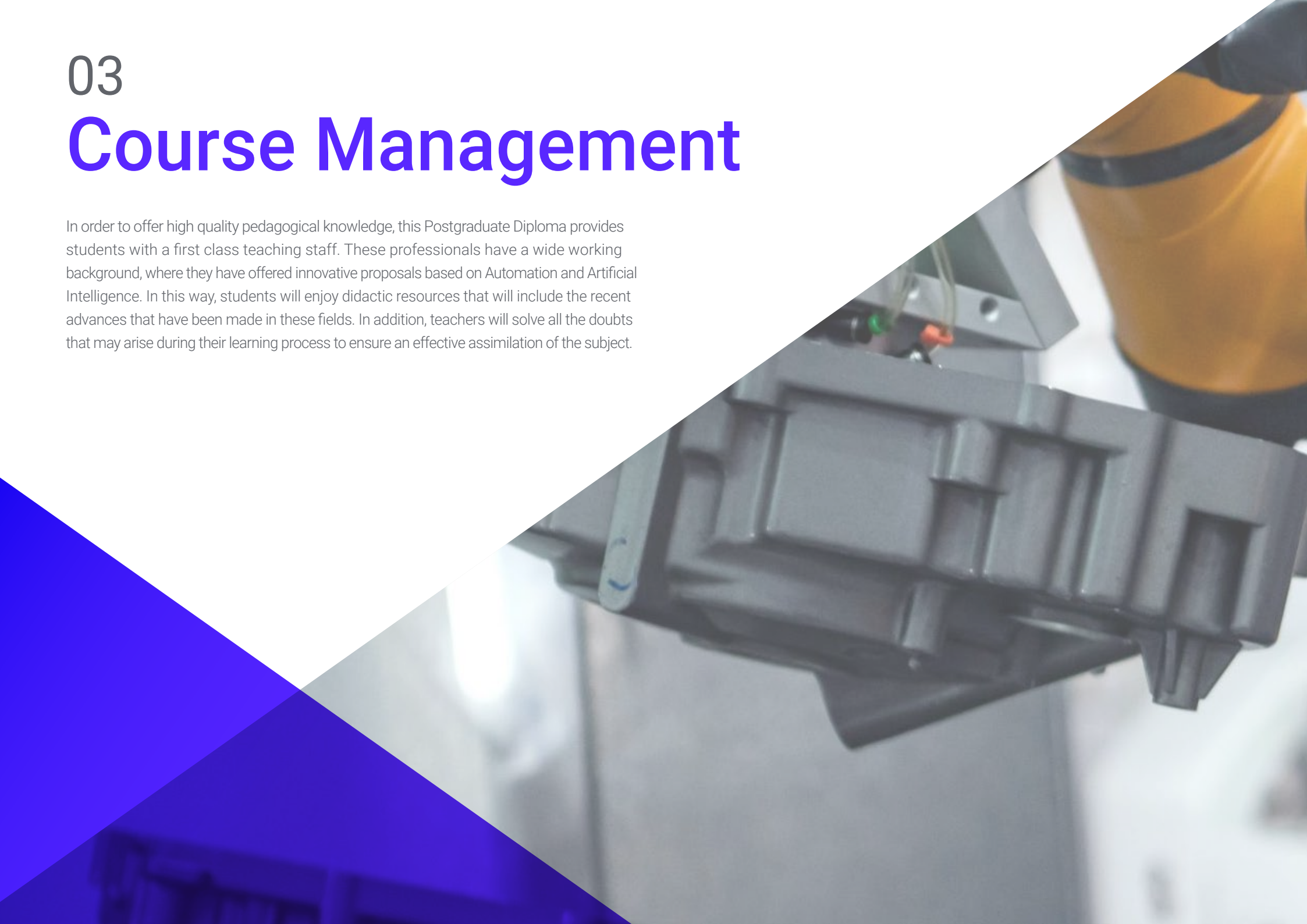
- ◆ Better understanding of the main automation and control systems, their connectivity, the types of industrial communications and the type of data they exchange
- ◆ Convert the production process facilities into a true Smart Factory
- ◆ Be able to deal with large amounts of data, define their analysis and derive value from them
- ◆ Define continuous monitoring, predictive and prescriptive maintenance models



03

# Course Management

In order to offer high quality pedagogical knowledge, this Postgraduate Diploma provides students with a first class teaching staff. These professionals have a wide working background, where they have offered innovative proposals based on Automation and Artificial Intelligence. In this way, students will enjoy didactic resources that will include the recent advances that have been made in these fields. In addition, teachers will solve all the doubts that may arise during their learning process to ensure an effective assimilation of the subject.



“

*Take a step forward in your professional career with this program, taught by experts with extensive experience in the field of Artificial Intelligence”*

## Management



### Dr. Segovia Escobar, Pablo

- ♦ Chief Executive of the Defense Sector in the Company TecnoBit of the Oesía Group
- ♦ Corporate Project Director Indra
- ♦ Master's Degree in Companies Administration and Management by the National University of Distance Education
- ♦ Postgraduate in Strategic Management Function
- ♦ Member of: Spanish Association of People with High Intellectual Quotient



### Dr. Diezma López, Pedro

- ♦ Chief Innovation Officer and CEO of Zerintia Technologies
- ♦ Founder of the technology company Acuilae
- ♦ Member of the Kebala Group for business incubation and promotion
- ♦ Consultant for technology companies such as Endesa, Airbus or Telefónica
- ♦ Wearable "Best Initiative" Award in eHealth 2017 and "Best Technological "Solution" 2018 for occupational safety





## Professors

### Ms. Sánchez López, Cristina

- ◆ CEO and founder of Acuilae
- ◆ Artificial Intelligence consultant at ANHELA IT
- ◆ Creator of Etyka Software for Computer System Security
- ◆ (Software Engineer) for the Accenture Group in large clients such as Bank of Santander, BBVA, Endesa or Barclays Bank
- ◆ Master's Degree in Data Science at KSchool
- ◆ Degree in Statistics from the Complutense University Madrid

### Mr. Castellano Nieto, Francisco

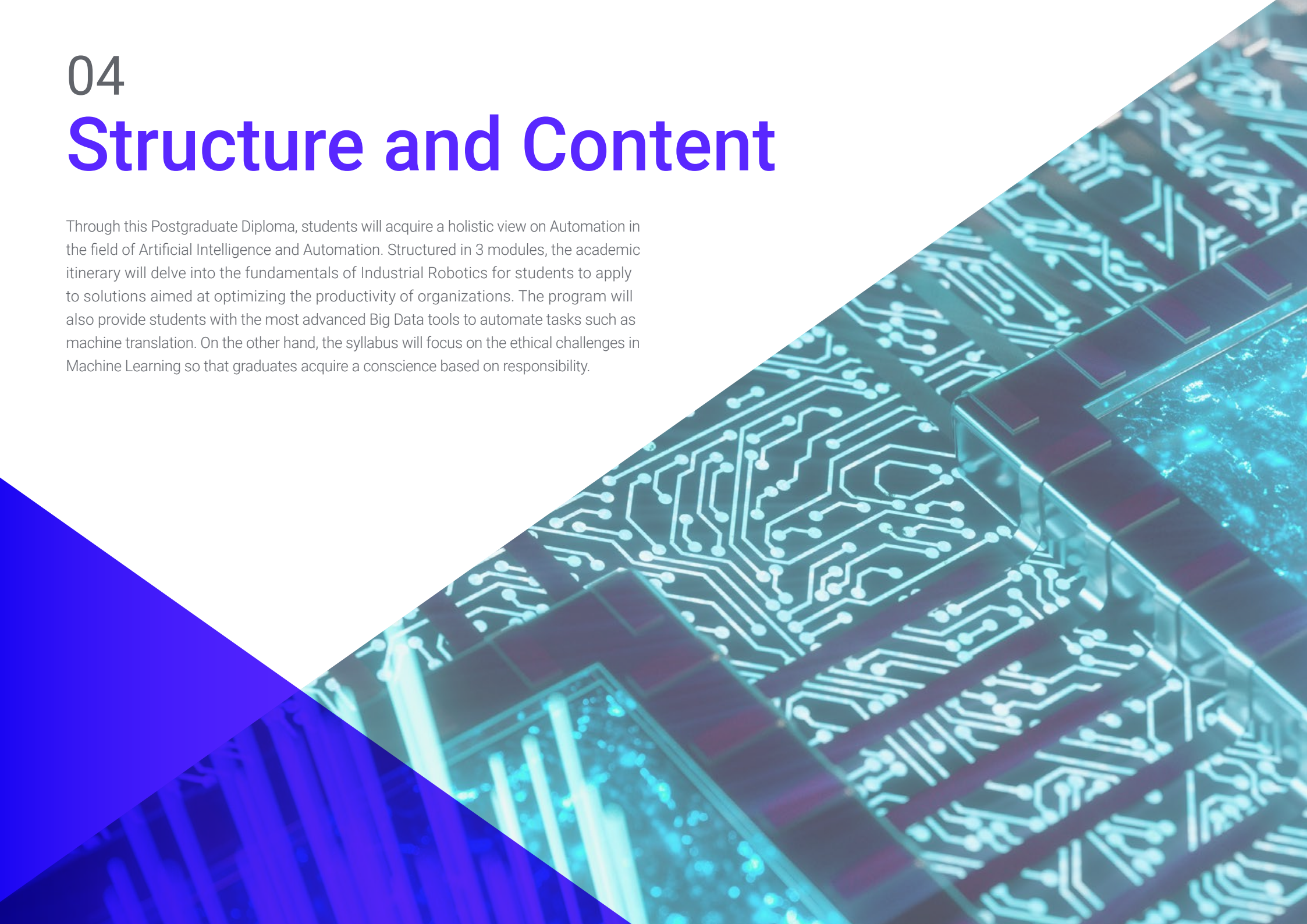
- ◆ Head of Indra Company Maintenance Area
- ◆ Consultant for Siemens AG, Allen-Bradley at Rockwell Automation and other companies
- ◆ Industrial Electronic Technical Engineer by the Universidad Pontificia Comillas

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

# 04

# Structure and Content

Through this Postgraduate Diploma, students will acquire a holistic view on Automation in the field of Artificial Intelligence and Automation. Structured in 3 modules, the academic itinerary will delve into the fundamentals of Industrial Robotics for students to apply to solutions aimed at optimizing the productivity of organizations. The program will also provide students with the most advanced Big Data tools to automate tasks such as machine translation. On the other hand, the syllabus will focus on the ethical challenges in Machine Learning so that graduates acquire a conscience based on responsibility.





“

*A quality curriculum at the forefront of academic teaching will provide you with the latest trends in the Machine Learning area"*



## Module 1. Industry 4.0. Automation Systems

- 1.1. Industrial Automation
  - 1.1.1. Automation
  - 1.1.2. Architecture and Components
  - 1.1.3. Safety
- 1.2. Industrial Robotics
  - 1.2.1. Fundamentals of Industrial Robotics
  - 1.2.2. Models and Impact on Industrial Processes
- 1.3. PLC Systems and Industrial Control
  - 1.3.1. PLC Evolution and Status
  - 1.3.2. Evolution of Programming Languages
  - 1.3.3. Computer Integrated Automation CIM
- 1.4. Sensors and Actuators
  - 1.4.1. Classification of Transducers
  - 1.4.2. Types of Sensors
  - 1.4.3. Standardization of Signals
- 1.5. Monitor and Manage
  - 1.5.1. Types of Actuators
  - 1.5.2. Feedback Control Systems
- 1.6. Industrial Connectivity
  - 1.6.1. Standardized Fieldbuses
  - 1.6.2. Connectivity
- 1.7. Proactive / Predictive Maintenance
  - 1.7.1. Predictive Maintenance
  - 1.7.2. Fault Identification and Analysis
  - 1.7.3. Proactive Actions Based on Predictive Maintenance
- 1.8. Continuous Monitoring and Prescriptive Maintenance
  - 1.8.1. Prescriptive Maintenance Concept in Industrial Environments
  - 1.8.2. Selection and Exploitation of Data for Self-Diagnostics
- 1.9. Lean Manufacturing
  - 1.9.1. Lean Manufacturing
  - 1.9.2. Benefits of Lean Implementation in Industrial Processes

- 1.10. Industrialized Processes in Industry 4.0. Use Case
  - 1.10.1. Project definition
  - 1.10.2. Technological Selection
  - 1.10.3. Connectivity
  - 1.10.4. Data Exploitation

## Module 2. Big Data and Artificial Intelligence

- 2.1. Fundamental Principles of Big Data
  - 2.1.1. Big Data
  - 2.1.2. Tools to Work With Big Data
- 2.2. Data Mining and Warehousing
  - 2.2.1. Data Mining Cleaning and Standardization
  - 2.2.2. Information Extraction, Machine Translation, Sentiment Analysis, etc
  - 2.2.3. Types of Data Storage
- 2.3. Data Intake Applications
  - 2.3.1. Principles of Data intake
  - 2.3.2. Data Ingestion Technologies to Serve Business Needs
- 2.4. Data Visualization
  - 2.4.1. The Importance of Data Visualization
  - 2.4.2. Tools to Carry It Out Tableau, D3, matplotlib (Python), Shiny®
- 2.5. Machine Learning
  - 2.5.1. Understanding Machine Learning
  - 2.5.2. Supervised and Unsupervised Learning
  - 2.5.3. Types of Algorithms
- 2.6. Neural Networks (Deep Learning)
  - 2.6.1. Neural Network: Parts and Operation
  - 2.6.2. Types of Networks CNN, RNN
  - 2.6.3. Applications of Neural Networks; Image Recognition and Natural Language Interpretation
  - 2.6.4. Generative Text Networks: LSTM
- 2.7. Natural Language Recognition
  - 2.7.1. PLN (Processing Natural Language)
  - 2.7.2. Advanced PLN Techniques: Word2vec, Doc2vec

- 2.8. Chatbots and Virtual Assistants
  - 2.8.1. Types of Assistants: Voice and Text Assistants
  - 2.8.2. Fundamental Parts for the Development of an Assistant: Intents, Entities and Dialog Flow
  - 2.8.3. Integrations: Web, Slack, WhatsApp, Facebook
  - 2.8.4. Assistant Development Tools: Dialogflow, Watson Assistant
- 2.9. Emotions, Creativity and Personality in IA
  - 2.9.1. Understand How to Detect Emotions Using Algorithms
  - 2.9.2. Creating a Personality: Language, Expressions and Content
- 2.10. Future of Artificial Intelligence
- 2.11. Reflections

### Module 3. Robotics, Drones and Augmented Workers

- 3.1. Robotics
  - 3.1.1. Robotics, Societies and Cinema
  - 3.1.2. Components and Parts of Robot
- 3.2. Robotics and Advanced Automation: Simulators, Cobots
  - 3.2.1. Transfer of Learning
  - 3.2.2. Cobots and Case Uses
- 3.3. RPA (Robotic Process Automatization)
  - 3.3.1. Understanding RPA and its Functioning
  - 3.3.2. RPA Platforms, Projects and Roles
- 3.4. Robot as a Service (RaaS)
  - 3.4.1. Challenges and Opportunities for Implementing RaaS Services and Robotics in Enterprises
  - 3.4.2. Operation of a RaaS system
- 3.5. Drones and Automated Vehicles
  - 3.5.1. Components and Drones Operation
  - 3.5.2. Uses, Types and Applications of Drones
  - 3.5.3. Evolution of Drones and Autonomous Vehicles
- 3.6. The Impact of 5G
  - 3.6.1. Evolution of Communications and Implications
  - 3.6.2. Uses of 5G Technology

- 3.7. Augmented Workers
  - 3.7.1. Human-Machine Integration in Industrial Environments
  - 3.7.2. Challenges in Worker-Robot Collaboration
- 3.8. Transparency, Ethics and Traceability
  - 3.8.1. Ethical Challenges in Robotics and Artificial Intelligence
  - 3.8.2. Monitoring, Transparency and Traceability Methods
- 3.9. Prototyping, Components and Evolution
  - 3.9.1. Prototyping Platforms
  - 3.9.2. Phases to Make a Prototype
- 3.10. Future of Robotics
  - 3.10.1. Trends in Robotization
  - 3.10.2. New Types of Robots



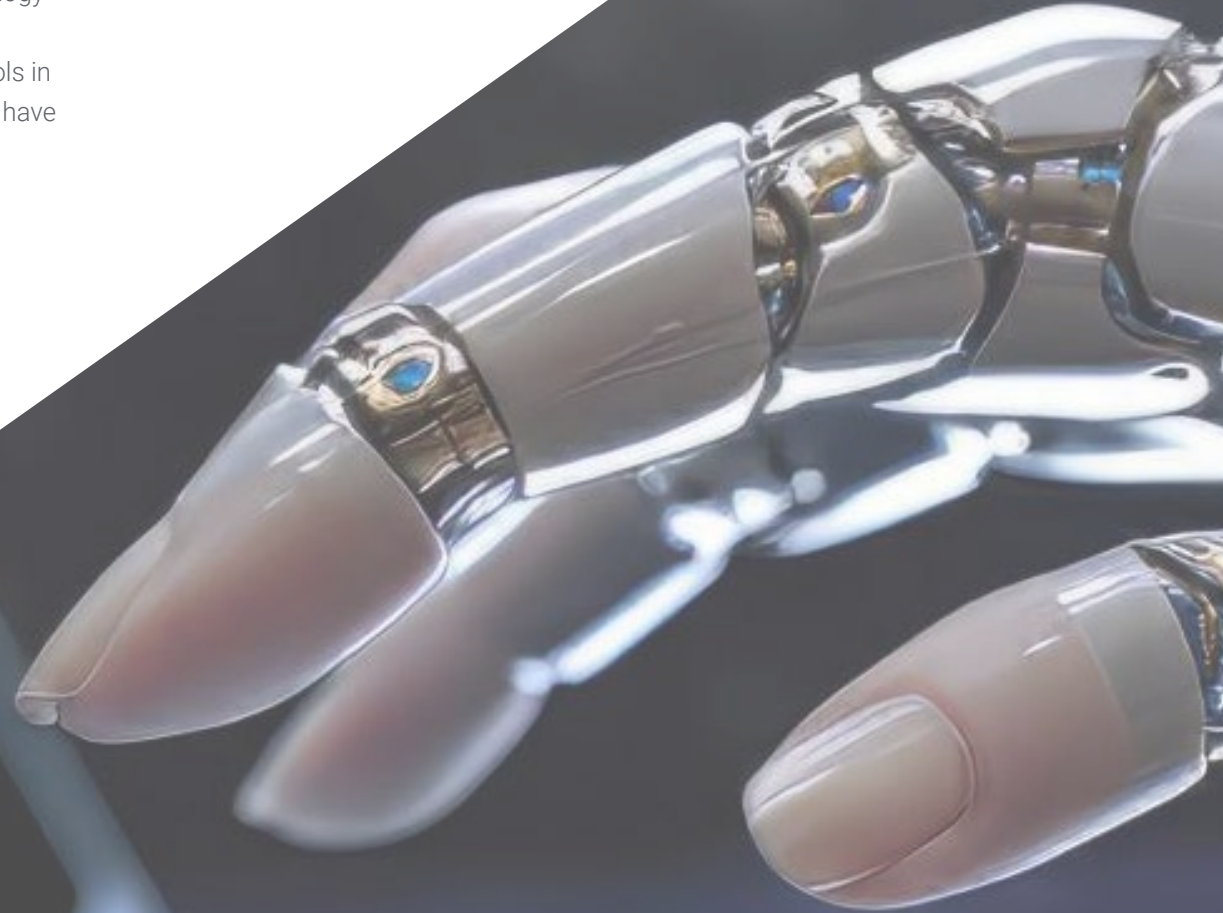
*This program allows you to exercise in simulated environments, which will provide you with an immersive learning experience to specialize you for real situations"*

05

# Methodology

This academic program offers students a different way of learning. Our methodology uses a cyclical learning approach: **Relearning**.

This teaching system is used, for example, in the most prestigious medical schools in the world, and major publications such as the **New England Journal of Medicine** have considered it to be one of the most effective.







“

*Discover Relearning, a system that abandons conventional linear learning, to take you through cyclical teaching systems: a way of learning that has proven to be extremely effective, especially in subjects that require memorization"*

## Case Study to contextualize all content

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

“

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



*You will have access to a learning system based on repetition, with natural and progressive teaching throughout the entire syllabus.*



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

### A learning method that is different and innovative

This TECH program is an intensive educational program, created from scratch, which presents the most demanding challenges and decisions in this field, both nationally and internationally. This methodology promotes personal and professional growth, representing a significant step towards success. The case method, a technique that lays the foundation for this content, ensures that the most current economic, social and professional reality is taken into account.

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

The case method has been the most widely used learning system among the world's leading Information Technology schools for as long as they have existed. The case method was developed in 1912 so that law students would not only learn the law based on theoretical content. It consisted of presenting students with real-life, complex situations for them to make informed decisions and value judgments on how to resolve them. In 1924, Harvard adopted it as a standard teaching method.

What should a professional do in a given situation? This is the question that you are presented with in the case method, an action-oriented learning method. Throughout the course, students will be presented with multiple real cases. They will have to combine all their knowledge and research, and argue and defend their ideas and decisions.



## Relearning Methodology

TECH effectively combines the Case Study methodology with a 100% online learning system based on repetition, which combines different teaching elements in each lesson.

We enhance the Case Study with the best 100% online teaching method: Relearning.

*In 2019, we obtained the best learning results of all online universities in the world.*

At TECH you will learn using a cutting-edge methodology designed to train the executives of the future. This method, at the forefront of international teaching, is called Relearning.

Our university is the only one in the world authorized to employ this successful method. In 2019, we managed to improve our students' overall satisfaction levels (teaching quality, quality of materials, course structure, objectives...) based on the best online university indicators.



In our program, learning is not a linear process, but rather a spiral (learn, unlearn, forget, and re-learn). Therefore, we combine each of these elements concentrically.

This methodology has trained more than 650,000 university graduates with unprecedented success in fields as diverse as biochemistry, genetics, surgery, international law, management skills, sports science, philosophy, law, engineering, journalism, history, and financial markets and instruments. All this in a highly demanding environment, where the students have a strong socio-economic profile and an average age of 43.5 years.

*Relearning will allow you to learn with less effort and better performance, involving you more in your training, developing a critical mindset, defending arguments, and contrasting opinions: a direct equation for success.*

From the latest scientific evidence in the field of neuroscience, not only do we know how to organize information, ideas, images and memories, but we know that the place and context where we have learned something is fundamental for us to be able to remember it and store it in the hippocampus, to retain it in our long-term memory.

In this way, and in what is called neurocognitive context-dependent e-learning, the different elements in our program are connected to the context where the individual carries out their professional activity.



This program offers the best educational material, prepared with professionals in mind:



### Study Material

All teaching material is produced by the specialists who teach the course, specifically for the course, so that the teaching content is highly specific and precise.

These contents are then applied to the audiovisual format, to create the TECH online working method. All this, with the latest techniques that offer high quality pieces in each and every one of the materials that are made available to the student.



### Classes

There is scientific evidence suggesting that observing third-party experts can be useful.

Learning from an Expert strengthens knowledge and memory, and generates confidence in future difficult decisions.



### Practising Skills and Abilities

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



### Additional Reading

Recent articles, consensus documents and international guidelines, among others. In TECH's virtual library, students will have access to everything they need to complete their course.







#### Case Studies

Students will complete a selection of the best case studies chosen specifically for this program. Cases that are presented, analyzed, and supervised by the best specialists in the world.



#### Interactive Summaries

The TECH team presents the contents attractively and dynamically in multimedia lessons that include audio, videos, images, diagrams, and concept maps in order to reinforce knowledge.

This exclusive educational system for presenting multimedia content was awarded by Microsoft as a "European Success Story".



#### Testing & Retesting

We periodically evaluate and re-evaluate students' knowledge throughout the program, through assessment and self-assessment activities and exercises, so that they can see how they are achieving their goals.



06

# Certificate

The Postgraduate Diploma in Automation and Artificial Intelligence guarantees students, in addition to the most rigorous and up-to-date education, access to a Postgraduate Diploma 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 Diploma in Automation and Artificial Intelligence** 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 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 career evaluation committees.

Title: **Postgraduate Diploma in Automation and Artificial Intelligence**

Official N° 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.

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



## Postgraduate Diploma Automation and Artificial Intelligence

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