

# Postgraduate Certificate Mechatronic Systems Integration





## Postgraduate Certificate Mechatronic Systems Integration

- » Modality: online
- » Duration: 6 weeks
- » Certificate: TECH Global University
- » Credits: 6 ECTS
- » Schedule: at your own pace
- » Exams: online

Website: [www.techtute.com/us/engineering/postgraduate-certificate/mechatronic-systems-integration](http://www.techtute.com/us/engineering/postgraduate-certificate/mechatronic-systems-integration)

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# 01

# Introduction

The integration of Mechatronic Systems has led to a revolution that has resulted in the so-called Industry 4.0, characterized by the incorporation of digital tools to mechanical and manual manufacturing processes. Therefore, Industry 4.0 has transformed companies in this field, which now seek to combine advanced production techniques with intelligent technologies. In this context, TECH has designed an educational program based on the latest trends in the field of Mechatronic Systems Integration that responds to the current needs of companies in the sector. The program, which is 100% online, stands out for integrating all the control equipment involved in the control of processes through industrial communications.





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*Thanks to this Postgraduate Certificate you will master the Mechatronic Systems Integration. Enroll now and be at the forefront of Industry 4.0”*

Industry 4.0 has completely reinvented the way companies design, manufacture and distribute their products. Today, companies are embracing the use of new technologies in all their operations. This brings benefits such as improved efficiency and responsiveness to customers. Hence, they are looking for professionals with a high level of knowledge in Mechatronic Systems Integration.

In this sense, TECH has designed an innovative syllabus aimed at integrating the various control equipment involved in mechatronic systems. Through the resources of this program, graduates will be able to master new manufacturing technologies and effectively handle operator panels.

Also, with the 100% online methodology that uses this qualification, students will be able to comfortably complete the program. In addition, the syllabus will be supported by the innovative *Relearning* teaching system that relies on repetition to guarantee the mastery of its different aspects. At the same time, it mixes the learning process with real situations so that the knowledge is acquired in a natural and progressive way, without the extra effort of memorizing.

This **Postgraduate Certificate in Mechatronic Systems Integration** contains the most complete and up-to-date program on the market. The most important features include:

- ♦ The development of practical cases presented by experts in Mechatronic Systems Integration
- ♦ The graphic, schematic, and practical contents which provide Therapeutics and practical information on the disciplines that are essential for professional practice
- ♦ Practical exercises where the self-assessment process can be carried out to improve learning
- ♦ Its special emphasis on innovative methodologies
- ♦ Theoretical lessons, questions to the expert, debate forums on controversial topics, and individual reflection assignments
- ♦ Content that is accessible from any fixed or portable device with an Internet connection



*Study with the most prestigious faculty in the field of Mechatronics"*

“

*Enroll and master industrial communication networks to achieve an efficient and safe network”*

The program's teaching staff includes professionals from the field who contribute their work experience to this educational 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.

*With TECH, you will obtain data integration tools that will ensure success in your daily functions.*

*Thanks to this Postgraduate Certificate, you will be able to propose quality improvements in the production team and provide intelligent solutions.*



# 02 Objectives

This Postgraduate Certificate will allow students to acquire the necessary competences to update their skills in the profession after delving into the key aspects of Mechatronic Systems Integration. In addition, the main existing communication networks will be addressed for their subsequent integration into mechatronic systems. All this, through a 100% online methodology and with the support of a teaching staff of great experience and international reputation.







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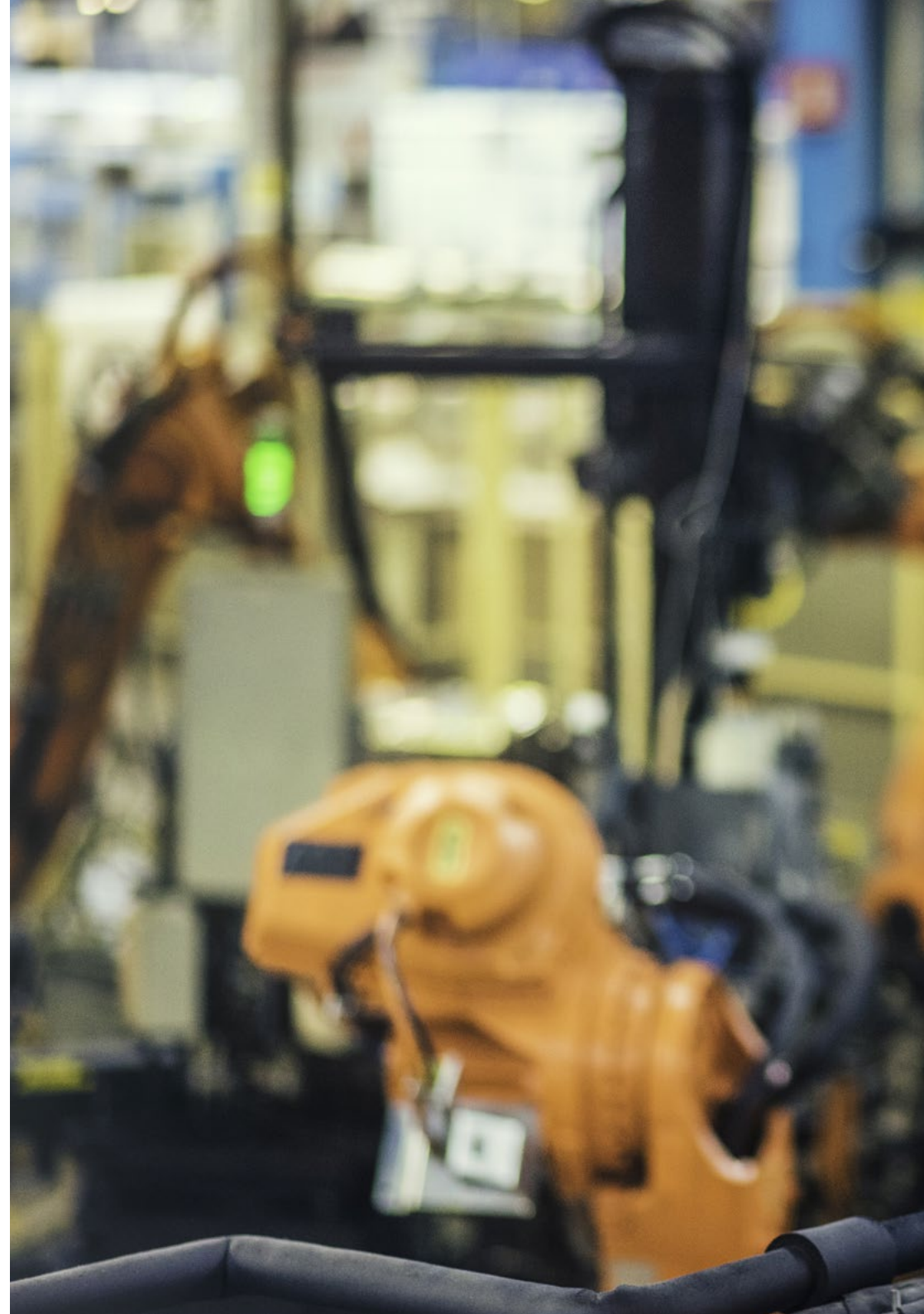
*Give your career the boost it needs and specialize in the sector of Mechatronic Systems Integration”*



## General Objectives

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- ♦ Determine the different integrated manufacturing models present in the industrial sector
- ♦ Justify the possibilities of system integration by means of industrial communications
- ♦ Examine the different possibilities of monitoring existing in the processes
- ♦ Analyze new integrated manufacturing systems
- ♦ Develop integrated manufacturing systems





## Specific Objectives

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- Assess the possibilities of integrated manufacturing currently available
- Analyze the different types of communication networks available and assess which type of communication network is the most suitable in certain scenarios
- Examine the Man-Machine Interface systems that allow the centralized control and monitoring of the processes, verifying their operation
- Support new manufacturing technologies based on Industry 4.0
- Integrate the different control equipment involved in mechatronic systems



*Orient your professional profile towards Mechatronics thanks to this Postgraduate Certificate"*

# 03

# Course Management

In addition to its online teaching methodology, this Postgraduate Certificate has a prestigious teaching staff, composed of professionals specialized in Mechatronic Systems. In this way, students will be able to delve into their knowledge in this area with the the accompaniment of great experts in this area. Likewise, students will acquire very useful knowledge that they will be able to apply in their professional career from the very first moment, since the focus of this program is eminently practical.





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*Acquire the necessary knowledge and skills to embark on the Mechatronic Systems Integration sector”*

## International Guest Director

With an extensive background in the Technology industry, Hassan Showkot is a renowned Computer Engineer highly specialized in the implementation of advanced robotic solutions in a variety of fields. He also stands out for his strategic vision to manage multidisciplinary work teams and lead projects oriented to the specific needs of clients.

In this way, he has worked in international reference companies such as Huawei or Omron Robotics and Safety Technologies. Among his main achievements, he has created innovative techniques to improve both the reliability and safety of robotic systems. In turn, this has enabled many companies to improve their operational processes and automate complex routine tasks ranging from inventory management to component manufacturing. As a result, institutions have managed to reduce human errors in their work chains and significantly increase their productivity .

In addition, it has led the Digital Transformation of numerous entities that needed to increase their competitiveness in the market and ensure their long-term sustainability in the market. Consequently, it has integrated emerging technological tools such as Artificial Intelligence, Machine Learning, Big Data, Internet of Things or Blockchain. Thanks to this, organizations have used predictive analytics systems to anticipate both trends and needs, something fundamental to adapt to a constantly changing business environment. This has also contributed to optimize informed strategic decision making, based on large volumes of data and even patterns.

In addition, its ability to manage initiatives with interdisciplinary groups has been essential to boost collaboration between different corporate departments. As a result, he has fostered an institutional culture based on innovation, excellence and continuous improvement. Undoubtedly, this has given businesses a substantial competitive advantage.



## Mr. Hassan, Showkot

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- Director of Omron Robotics and Safety Technologies in Illinois, United States
- Program Manager at Seminet, San Jose, San Jose
- Systems Analyst at Corporación Miriam INC, Lima
- Software Engineer at Huawei, Shenzhen
- M.S. in Engineering Technology at Purdue University
- Master in Business Administration with specialization in Project Management from the
- Bachelor's Degree in Computer Science and Engineering from Shahjalal University of Science and Technology

“

*Thanks to TECH, you will be able to learn with the best professionals in the world”*

## Address



### Dr. López Campos, José Ángel

- ♦ Specialist in design and numerical simulation of mechanical systems
- ♦ Calculation Engineer at ITERA TÉCNICA S.L.
- ♦ PhD in Industrial Engineering from the University of Vigo.
- ♦ Master's Degree in Automotive Engineering from the University of Vigo
- ♦ Master's Degree in Competition Vehicle Engineering, Antonio de Nebrija University
- ♦ Postgraduate Diploma FEM from the Polytechnic University of Madrid
- ♦ Degree in Mechanical Engineering from the University of Vigo.

## Professors

### Mr. Bretón Rodríguez, Javier

- ♦ Specialist in Industrial Engineering
- ♦ Industrial Technical Engineer at FLUNCK S.A.
- ♦ Industrial Technical Engineer at the Ministry of Education and Science of the Government of Spain
- ♦ Professor in the area of Systems and Automatic Engineering at the University of La Rioja
- ♦ Industrial Technical Engineer at the University of Zaragoza
- ♦ Industrial Engineer at the University of La Rioja
- ♦ Postgraduate Certificate of Advanced Studies and Research Proficiency in Electronics Engineering





# 04

# Structure and Content

The syllabus has been designed based on the requirements of Mechatronic Systems Integration, following the requirements proposed by the teaching team of this program. In this way, a syllabus has been established that offers an analysis of the different integrated manufacturing models present in the industry. In addition, it delves into the supervision and control systems to centralize processes. SCADA packages for both data collection and remote reporting are also addressed.





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*An expertly crafted syllabus and quality content are key to your learning success”*

## Module 1. Mechatronic Systems Integration

- 1.1. Integrated manufacturing systems
  - 1.1.1. Integrated manufacturing systems
  - 1.1.2. Industrial communications in systems integration
  - 1.1.3. Integration of control equipment in production processes
  - 1.1.4. New production paradigm: industry 4.0
- 1.2. Industrial Communication Networks
  - 1.2.1. Industrial communications. Evolution
  - 1.2.2. Structure of industrial networks
  - 1.2.3. Current Situation of Industrial Communications
- 1.3. Communication networks at the process interface level
  - 1.3.1. AS-i: elements
  - 1.3.2. IO-Link: elements
  - 1.3.3. Equipment integration
  - 1.3.4. Selection Criteria
  - 1.3.5. Application Examples
- 1.4. Communication networks at the control and regulation level
  - 1.4.1. Communication networks at the control and regulation level
  - 1.4.2. Profibus: elements
  - 1.4.3. Canbus: elements
  - 1.4.4. Equipment integration
  - 1.4.5. Selection Criteria
  - 1.4.6. Application Examples
- 1.5. Communication networks at centralized supervisory and command level
  - 1.5.1. Centralized supervisory and command level networks
  - 1.5.2. Profinet: elements
  - 1.5.3. Ethercat: elements
  - 1.5.4. Equipment integration
  - 1.5.5. Application Examples



- 1.6. Process monitoring and control systems
  - 1.6.1. Process monitoring and control systems
  - 1.6.2. Human-machine interfaces (HMI)
  - 1.6.3. Examples of use
- 1.7. Operator panels
  - 1.7.1. The operator panel as a human-machine interface
  - 1.7.2. Membrane panels
  - 1.7.3. Touch panels
  - 1.7.4. Communication possibilities of operator panels
  - 1.7.5. Selection Criteria
  - 1.7.6. Application Examples
- 1.8. SCADA Packages
  - 1.8.1. SCADA packages as human-machine interface
  - 1.8.2. Selection Criteria
  - 1.8.3. Application Examples
- 1.9. Industry 4.0. Smart manufacturing
  - 1.9.1. 4.0 Industry
  - 1.9.2. Architecture of the new factories
  - 1.9.3. Industry 4.0 technologies
  - 1.9.4. Examples of manufacturing based on Industry 4.0
- 1.10. Example of application integration of equipment in an automated process
  - 1.10.1. Description of the process to be automatized
  - 1.10.2. Selection of control equipment
  - 1.10.3. Equipment integration



*A program designed based on the latest trends and most advanced technologies. Enroll now!"*

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.



A background image showing a blue technical drawing with a ruler and a compass. The ruler is white with black markings, and the compass is silver. The drawing is on a blue surface with white dashed lines. The image is partially obscured by a white diagonal shape that contains the text.

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*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.

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*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 is the most widely used learning system in the best faculties in the world. The case method was developed in 1912 so that law students would not only learn the law based on theoretical content. It consisted of presenting students with real-life, complex situations for them to make informed decisions and value judgments on how to resolve them. In 1924, Harvard adopted it as a standard teaching method.

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

## Relearning Methodology

TECH effectively combines the Case Study methodology with a 100% online learning system based on repetition, which combines 8 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 Certificate in Mechatronic Systems Integration guarantees you, in addition to the most rigorous and updated training, access to a Executive Master's Degree issued by TECH Global University.





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

This program will allow you to obtain your **Postgraduate Certificate in Mechatronic Systems Integration** endorsed by **TECH Global University**, the world's largest online university.

**TECH Global University** is an official European University publicly recognized by the Government of Andorra ([official bulletin](#)). Andorra is part of the European Higher Education Area (EHEA) since 2003. The EHEA is an initiative promoted by the European Union that aims to organize the international training framework and harmonize the higher education systems of the member countries of this space. The project promotes common values, the implementation of collaborative tools and strengthening its quality assurance mechanisms to enhance collaboration and mobility among students, researchers and academics.

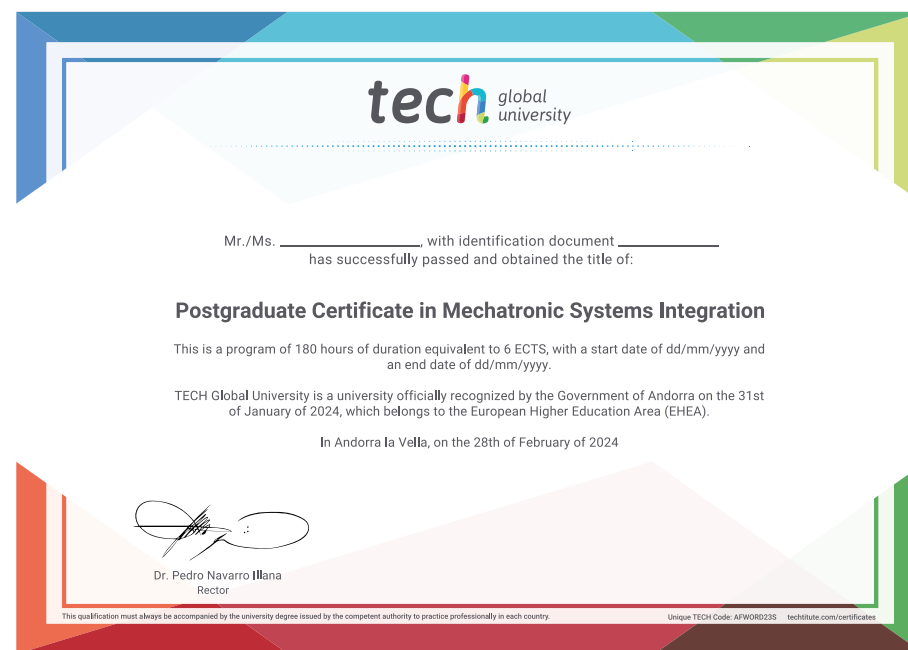
This **TECH Global University** title is a European program of continuing education and professional updating that guarantees the acquisition of competencies in its area of knowledge, providing a high curricular value to the student who completes the program.

Title: **Postgraduate Certificate in Mechatronic Systems Integration**

Modality: **online**

Duration: **6 weeks**

Accreditation: **6 ECTS**



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



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institutions technology learning

community commitment

**tech** global  
university

personalized service innovation

knowledge present  
online teaching

development languages

virtual classroom

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