

# Postgraduate Certificate Design and Manufacture of Mechatronic Systems



## Postgraduate Certificate Design and Manufacture of Mechatronic Systems

- » Modality: online
- » Duration: 12 weeks
- » Certificate: TECH Technological University
- » Dedication: 16h/week
- » Schedule: at your own pace
- » Exams: online

Website: [www.techtitude.com/in/engineering/postgraduate-certificate/design-manufacture-mechatronic-systems](http://www.techtitude.com/in/engineering/postgraduate-certificate/design-manufacture-mechatronic-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

The evolution of engineering has provoked a debate on the similarity between inventions. It seems that the boundaries between disciplines are blurring. In this context, TECH has developed a program where electronics, computing and control meet mechanics to develop intelligent processes that facilitate human activities. The program stands out for delving into the latest technologies in computing and industrial automation to analyze the basic systems that make up any mechatronic device. Likewise, the training is provided by prestigious teachers who guarantee project leadership. In addition, the 100% online syllabus allows students to study it comfortably, needing only a device with Internet access.





“

*Thanks to this 100% online TECH syllabus, you will delve into the development of intelligent processes that facilitate human activities"*

Due to the growing automation in various industries, mechatronics professionals are in great demand by institutions. In this line, more and more organizations are demanding the incorporation of experts to constantly raise their performance indicators and develop continuous improvement.

In view of this situation, TECH has designed a study program for students to recognize the different methods of motion transmission and transformation. They will also have the opportunity to analyze the typology of mechanisms that enable the transmission of motion. In turn, they will address the factors to be taken into account in gears, bearings, bearings and springs. In this sense, after completing the university program, graduates will be able to create innovative technological solutions in order to solve the needs of institutions and optimize their resources in an efficient way. Therefore, they will be highly qualified to occupy important positions in booming sectors such as Robotics, Health and Automotive.

In addition, this Postgraduate Certificate has a 100% online methodology where graduates will complete the program comfortably. They will only need a device with Internet access to expand their knowledge and become professionals in the Design and Manufacture of Mechatronic Systems. In addition, the syllabus is supported by the innovative *Relearning* teaching system: a process based on repetition, which ensures that knowledge is acquired in a natural and progressive way, without the effort of memorizing.

This **Postgraduate Certificate in Design and Manufacture of Mechatronic Systems** contains the most complete and up-to-date program on the market. Its most notable features are:

- ♦ The development of case studies presented by experts in Design and Manufacture of Mechatronic Systems
- ♦ The graphic, schematic and practical contents with which it is conceived provide cutting- Therapeutics and practical information on those 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.



*Contribute to the creation of innovative technological solutions thanks to this cutting-edge university program"*



*You will master the different types of industrial mechanisms thanks to this exclusive TECH program"*

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.

*You will overcome the challenge of combining the design and production of goods made with both electronic and mechanical parts.*

*The teaching team of this program will provide you with a multidisciplinary vision to lead technological projects.*



# 02 Objectives

The program design of this Postgraduate Certificate will allow computer, electronic or industrial engineers to update their professional skills by deepening their knowledge of the key aspects of Design and Manufacture of Mechatronic Systems. Based on the most modern technologies, the experts will acquire the necessary skills to assume responsibilities in the design of mechanical systems. In this way, they will advance on their path to excellence and will be qualified to join the most prestigious companies in the engineering field.





“

*With this TECH Postgraduate Certificate you will create state-of-the-art technologies in the Robotics and Automotive industry"*



## General Objectives

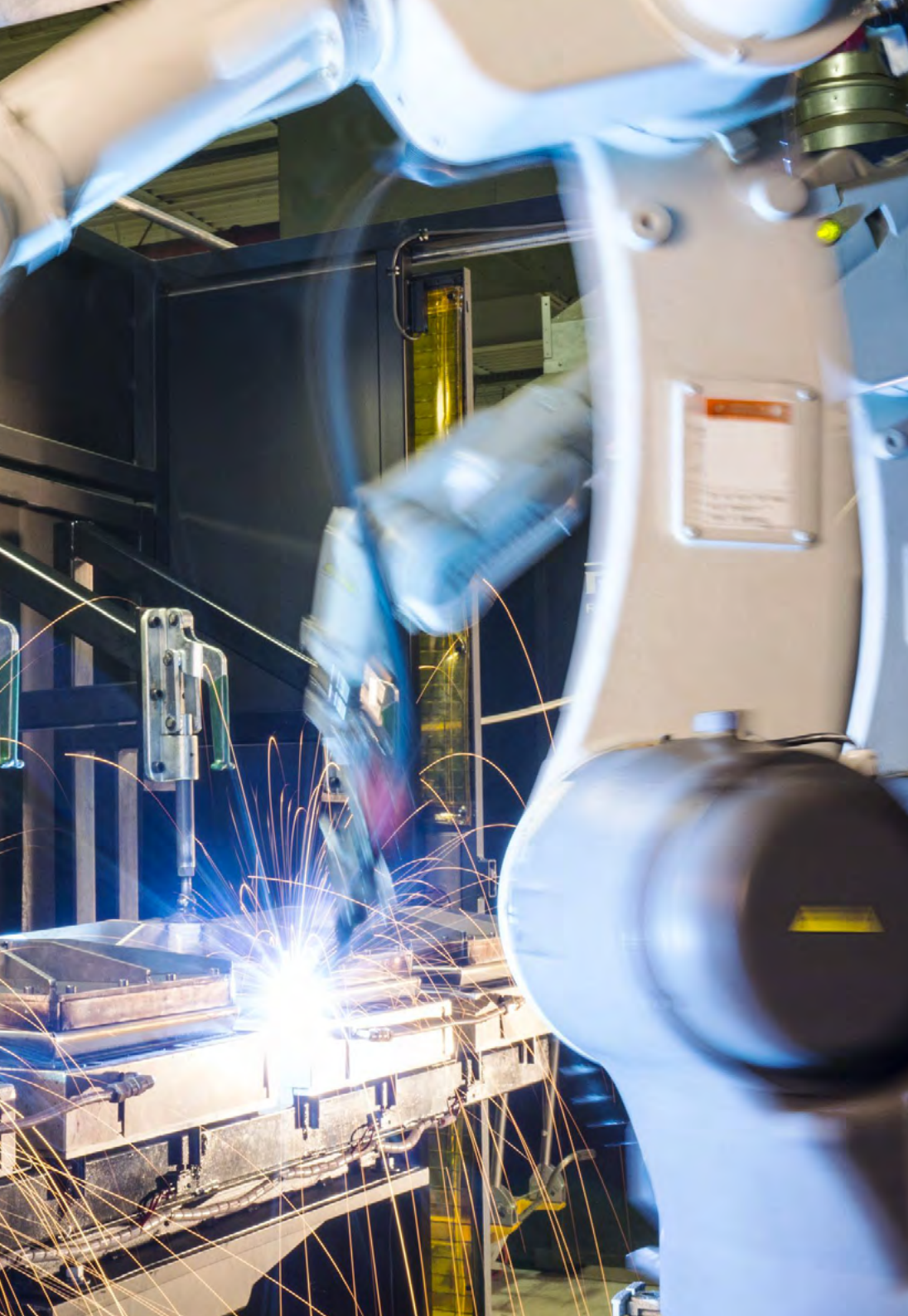
- ♦ Identify and analyze the main types of industrial mechanisms
- ♦ Evaluate and analyze the stresses to which the main types of mechanical systems and elements are subjected
- ♦ Establish the main guidelines to be taken into account in the design of these systems
- ♦ Expand specific knowledge on evaluation criteria and selection of mechanical devices
- ♦ Develop the necessary basis to enable and facilitate versatile learning of new methodologies
- ♦ Generate the ability to write and interpret technical documentation
- ♦ Identify the common characteristics necessary to configure, simulate, build and test prototypes of mechatronic systems
- ♦ Fundamentals of abstraction and logical reasoning skills



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







## Specific Objectives

---

- ♦ Present the main fundamentals of mechatronic systems, as well as their context within today's technological development
- ♦ Establish a habit of integrating assisted manufacturing techniques in the day-to-day design of mechanical components
- ♦ Analyze the existing techniques, as well as the norms, regulations and standards in the assisted development of mechanical components
- ♦ Establish the quality and quality control criteria necessary for the correct development of the manufacturing process
- ♦ Define relationships and equations to create parametric models that adapt to design changes in an agile way
- ♦ Finding and utilizing available resources from mechatronic element manufacturers or repositories and including them in the design to increase productivity
- ♦ Develop bent sheet metal parts efficiently
- ♦ Generate technical drawings and detailed plans from 3D models of parts and assemblies

03

# Course Management

In its maxim of offering an elite education for all, TECH counts on renowned professionals so that the student acquires a solid knowledge in the specialty of Design and Manufacture of Mechatronic Systems. Therefore, this Postgraduate Certificate has a highly qualified team with extensive experience in the electronics sector, which will provide the best tools for students in the development of their skills during the academic pathway. In this way, each graduate has the guarantees required to specialize at an international level in a booming sector that will catapult them to professional success.





“

*Thanks to TECH's innovative program,  
you will give a boost of efficiency to  
your career and you will succeed in  
Mechatronics Engineering"*



## Management



### Dr. López Campos, José Ángel

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

## Professors

### Mr. Agudo del Río, David

- ♦ Specialist in Mechanics, Energy and Sustainability
- ♦ Simulation Engineer at CTAG-IDIADA Safety Technology
- ♦ Simulation Engineer at Makross Simulation and Testing
- ♦ Industrial Technical Engineer at the Granite Technological Center
- ♦ Researcher at the University of Vigo
- ♦ Degree in Mechanical Engineering at the Catholic University of Ávila
- ♦ Specialization in Technical Industrial and Mechanical Engineering at the University of Vigo
- ♦ Professional Master's Degree in Energy and Sustainability from the University of Vigo

### Mr. Madalin Marina, Cosmin

- ♦ Researcher and specialist in Computer Engineering
- ♦ Graduate in Computer Engineering from the University of Alcalá, Spain
- ♦ Mention in Computer Science by the University of Alcalá
- ♦ Professional Master's Degree in Artificial Intelligence Research from the UNED (Spanish National Distance Education University)
- ♦ University Extension Course: Functional Analysis







04

# Structure and Content

This Postgraduate Certificate has a very complete syllabus that offers a broad perspective of the Design and Manufacture of Mechatronic Systems. Throughout the academic itinerary, graduates will examine the most advanced mechanical manufacturing technologies, as well as the metrology tools to control their results. In addition, they will delve into 3D parametric design and the software required for these projects. To master all these aspects, graduates will have at their disposal exclusive materials, complementary readings and multimedia resources such as explanatory videos and interactive summaries.





“

*Expert syllabus and  
quality content are the key  
to your learning success”*

## Module 1. Assisted Manufacturing of Mechanical Components in Mechatronic Systems

- 1.1. Mechanical Manufacturing in Mechatronic Systems
  - 1.1.1. Mechanical Manufacturing Technologies
  - 1.1.2. Mechanical Manufacturing in the Mechatronics Industry
  - 1.1.3. Advances in Mechanical Manufacturing in the Mechatronics Industry
- 1.2. Material Removal Processes
  - 1.2.1. Theory of Metal Cutting
  - 1.2.2. Traditional Machining Processes
  - 1.2.3. CNC and Automation in Manufacturing
- 1.3. Sheet Metal Forming Technologies
  - 1.3.1. Sheet Metal Cutting Technologies: Laser, Water and Plasma
  - 1.3.2. Technology Selection Criteria
  - 1.3.3. Sheet Metal Vending
- 1.4. Abrasion Processes
  - 1.4.1. Manufacturing Techniques by Abrasion
  - 1.4.2. Abrasive Tools
  - 1.4.3. Shot Blasting and Sandblasting Processes
- 1.5. Advanced Technologies in Mechanical Manufacturing
  - 1.5.1. Additive Manufacturing and its Applications
  - 1.5.2. Micro-Manufacturing and Nanotechnology
  - 1.5.3. Electrical Discharge Machining
- 1.6. Rapid Prototyping Techniques
  - 1.6.1. 3D Printing in Rapid Prototyping
  - 1.6.2. Rapid Prototyping Applications
  - 1.6.3. 3D Printing Solutions
- 1.7. Design for Manufacturing in Mechatronic Systems
  - 1.7.1. Manufacturing-oriented Design Principles
  - 1.7.2. Topological Optimization
  - 1.7.3. Design Innovation for Manufacturing in Mechatronics Systems
- 1.8. Plastic Forming Technologies
  - 1.8.1. Injection Molding Processes
  - 1.8.2. Blow Molding
  - 1.8.3. Compression and Transfer Molding





- 1.9. Advanced Technologies in Plastic Forming
  - 1.9.1. Metrology
  - 1.9.2. Units of Measurement and International Standards
  - 1.9.3. Measuring Instruments and Tools
  - 1.9.4. Advanced Metrology Techniques
- 1.10. Quality Control
  - 1.10.1. Measuring Methods and Sampling Techniques
  - 1.10.2. Statistical Process Control (SPC)
  - 1.10.3. Regulations and Quality Standards
  - 1.10.4. Total Quality Management (TQM)

## Module 2. Design of Mechatronic Systems

- 2.1. CAD in Engineering
  - 2.1.1. CAD in Engineering
  - 2.1.2. 3D Parametric Design
  - 2.1.3. Types of Software on the Market
  - 2.1.4. SolidWorks. Inventor
- 2.2. Work Environment
  - 2.2.1. Work Environment
  - 2.2.2. Menus
  - 2.2.3. Visualization
  - 2.2.4. Default Settings of the Working Environment
- 2.3. Layout and Work Structure
  - 2.3.1. 3D Computer-aided Design
  - 2.3.2. Parametric Design Methodology
  - 2.3.3. Methodology for the Design of Assemblies of Parts. Assemblies
- 2.4. Sketching
  - 2.4.1. Basics of Sketch Design
  - 2.4.2. 2D Sketch Creation
  - 2.4.3. Sketch Editing Tools
  - 2.4.4. Sketch Dimensioning and Relationships
  - 2.4.5. 3D Sketch Creation

- 2.5. Mechanical Design Operations
  - 2.5.1. Mechanical Design Methodology
  - 2.5.2. Mechanical design operations
  - 2.5.3. Other Operations
- 2.6. Surfaces
  - 2.6.1. Creating Surfaces
  - 2.6.2. Tools for Creating Surfaces
  - 2.6.3. Tools for Surface Editing
- 2.7. Assemblies
  - 2.7.1. Creation of Assemblies
  - 2.7.2. The Relationships in Position
  - 2.7.3. Tools for the Creation of Assemblies
- 2.8. Normalization and Design Tables. Variables
  - 2.8.1. Component Library. Toolbox
  - 2.8.2. Online Repositories/element Manufacturers
  - 2.8.3. Design Tables
- 2.9. Folded Sheet Metal
  - 2.9.1. Folded Sheet Metal Module in CAD Software
  - 2.9.2. Sheet Metal Operations
  - 2.9.3. Developments for Sheet Metal Cutting
- 2.10. Drawing Generation
  - 2.10.1. Creation of Drawings
  - 2.10.2. Drawing Formats
  - 2.10.3. Creation of Views
  - 2.10.4. Dimensioning
  - 2.10.5. Annotations
  - 2.10.6. Lists and Tables

# 05 Methodology

This program offers students a different way of learning. Our methodology follows a cyclical learning process: **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 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*”



*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 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 prepare 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 prepared 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 education, 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 adapted in 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.



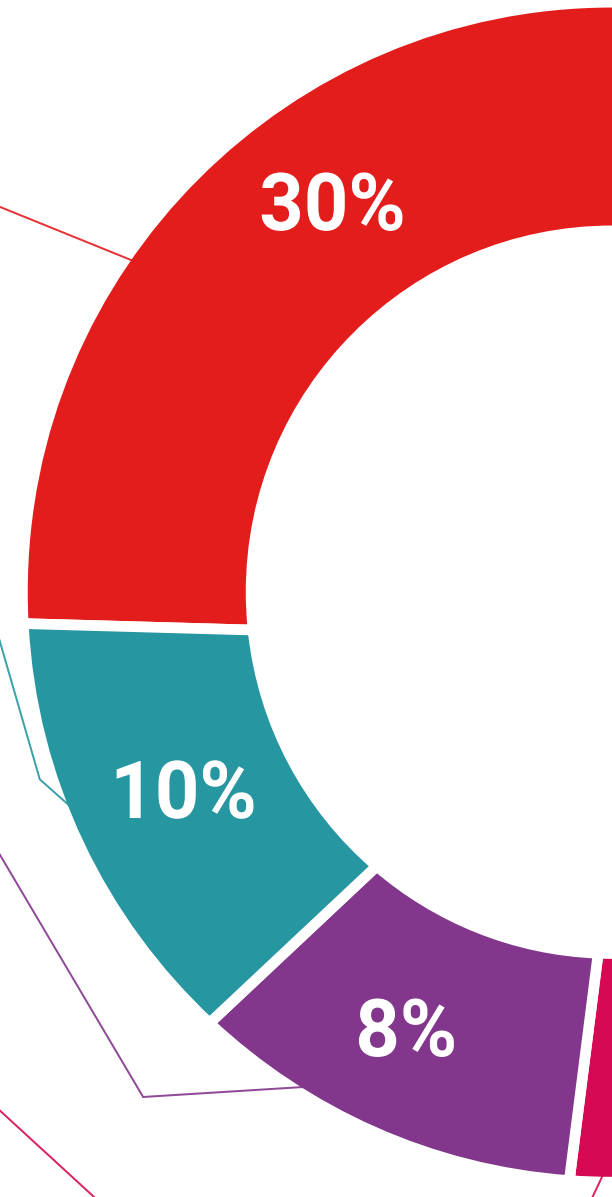
#### Practicing Skills and Abilities

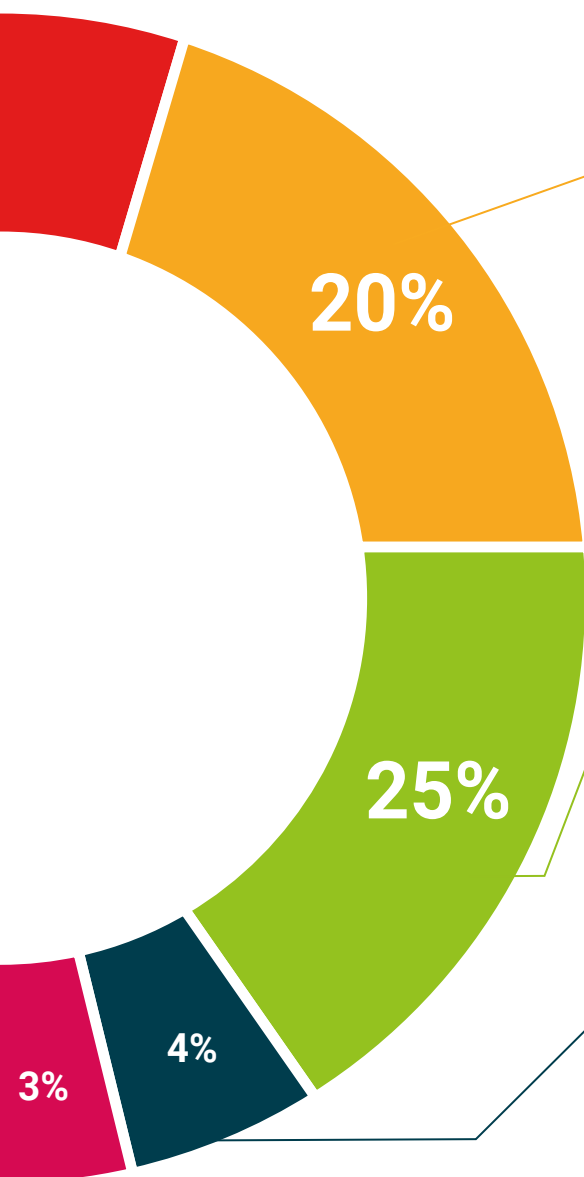
They will carry out activities to develop specific competencies and skills in each thematic field. Exercises and activities to acquire and develop the skills and abilities that a specialist needs to develop in the context of the globalization that we are experiencing.



#### 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 assess and re-assess 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

This Postgraduate Certificate in Design and Manufacture of Mechatronic Systems guarantees students, in addition to the most rigorous and up-to-date education, access to a Postgraduate Certificate issued by TECH Technological University.





“

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

This **Postgraduate Certificate in Design and Manufacture of Mechatronic Systems** contains the most complete and up-to-date program on the market.

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

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

Title: **Postgraduate Certificate in Design and Manufacture of Mechatronic Systems**

Official N° of Hours: **300 hours**.



\*Apostille Convention. In the event that the student wishes to have their paper certificate 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  
online training  
development language  
classroom



## Postgraduate Certificate Design and Manufacture of Mechatronic Systems

- » Modality: online
- » Duration: 12 weeks
- » Certificate: TECH Technological University
- » Dedication: 16h/week
- » Schedule: at your own pace
- » Exams: online

# Postgraduate Certificate Design and Manufacture of Mechatronic Systems

