Postgraduate Diploma

Manufacturing and Integration of Mechatronic Systems

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Postgraduate Diploma
Manufacturing and Integration of Mechatronic Systems

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

Website: **www.techtitute.com/pk/engineering/postgraduate-certificate/manufacturing-integration-mechatronic-systems**

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01

Introduction

Areas such as Robotics and Artificial Intelligence have experienced great advances in recent years, driven by the continuous development of new Mechatronic Systems. Therefore, Mechatronics has become a fundamental discipline in the industrial sector, which needs to use devices and components that improve the efficiency of its processes and reduce its production costs. In this context, TECH has designed a training through which graduates will acquire knowledge and skills to overcome any technological challenge in the Manufacture and Integration of Mechatronic Systems. All this, in a 100% online format and with the best didactic resources of the academic market: interactive summaries, case studies and videos in detail.

Master the most advanced processes of Mechatronic Systems Manufacturing thanks to this Postgraduate Diploma"

Mechatronics Engineering is recognized worldwide thanks to its contribution to research and technological development in all areas of society. Therefore, companies in sectors such as the industrial sector are increasingly demanding the incorporation of experts in Mechatronics to improve the efficiency of the manufacturing of their products.

Taking into account this context, TECH has designed this Postgraduate Diploma in Manufacturing and Integration of Mechatronic Systems. The academic program addresses the latest advances that have occurred in the mechatronics sector, thus preparing graduates to successfully overcome technological challenges that require interdisciplinarity. To this end, it delves into the advances in Mechanical Manufacturing and emphasizes SCADA packages to incorporate them into industrial control processes. It also delves into the new revolution of Industry 4.0 with the purpose of combining the most advanced production techniques with the main intelligent technologies.

With a 100% online methodology, students will study the Postgraduate Diploma with ease and will only need a device with Internet access. It should be noted that the syllabus is based on the innovative *Relearning*teaching system, based on repetition to strengthen students' knowledge. At the same time, it mixes the learning process with real situations so that the competencies are acquired in a natural and progressive way. All this, with an eminently professional orientation, allowing students to immediately apply everything they have learned in their daily work.

This **Postgraduate Certificate in Manufacturing and Integration of Mechatronic Systems** 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 Manufacturing and Integration 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

This Postgraduate Diploma will prepare you to respond to the current and future challenges of Mechatronics"

Stand out in a sector with great professional projection. Enroll now and advance your career immediately"

You will expand your knowledge with the most advanced and effective teaching methodology: TECH Relearning.

Study with the most prestigious and experienced teaching staff in the area of Mechatronics.

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.

02

Objectives

The main objective of the Postgraduate Diploma is that students develop a theoretical and practical learning, which allows them to be prepared to face the constant changes in the technological landscape. In this way, they will be highly qualified to adapt to key positions in sectors such as the food industry, automotive, health and robotics, among many others. An elite program designed to respond to the future challenges of manufacturing parts, mechanisms and mechatronic devices.

With TECH you will be prepared to successfully overcome the constant changes occurring in the technological landscape"

General Objectives

- 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
- Define the fundamentals of embedded systems, including their architecture, components and applications in modern engineering
- Analyze the main architectures and programming languages used in the design of embedded systems
- Explore the specific applications of embedded systems in various engineering fields, such as process control, industrial automation, communications, and signal processing
- Analyze security measures and design strategies that ensure the integrity and reliability of embedded systems, considering critical aspects such as protection against cyber threats, fault tolerance and recovery from adverse situations
- Determine the different models of embedded manufacturing present in the industrial world
- Fundamentals of the possibilities of system integration through industrial communications
- Examine the different possibilities of supervision in processes
- Analyze new integrated manufacturing systems
- Develop integrated manufacturing systems

Specific Objectives

Module 1. Assisted Manufacturing of Mechanical Components in Mechatronic Systems

- 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

Module 2. Embedded Systems

- Delve into the study and analysis of microprocessors, including architectures, instruction sets and programming strategies specific to embedded microprocessors
- Develop skills in the design and implementation of real-time embedded systems, addressing applications such as industrial process control, signal filtering, pattern detection, and real-time data acquisition
- Develop competencies in the design and programming of programmable hardware, such as FPGAs, and in the use of single board computers (SBCs) for the creation of embedded systems
- Develop skills to design, develop, and deploy IoT solutions, including connecting embedded devices to the cloud, managing data, and creating IoT applications

Module 3. Mechatronic Systems Integration

- Evaluate the possibilities of integrated manufacturing that exist today
- Analyze the different types of communication networks available and assess which type of communication network is the most suitable in given scenarios
- Examine human-machine interface systems that allow centralized control and monitoring of processes, verifying their operation
- Fundamentals of new manufacturing technologies based on Industry 4.0
- Integrate the different control equipment involved in mechatronic systems

Thanks to the pedagogical resources offered by TECH you will master the most advanced technologies in Manufacturing and Integration of Mechatronic Systems"

03

Course Management

In line with its philosophy of offering quality education, TECH has at its disposal a teaching staff with international prestige. These specialists have extensive professional experience in the Manufacture and Integration of Mechatronic Systems, which contributes to offering the most complete and dynamic resources in the academic market. In this way, students have the guarantees they demand to specialize in a booming sector.

The syllabus is supported by a prestigious teaching staff to ensure successful learning"

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. Bretón Rodríguez, Javier

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

Mr. Peláez Rodríguez, César

- Specialist in Information and Communications Technologies
- Visiting Assistant in Research Yale University
- R&D Engineer at SEADAM - Valladolid
- Researcher in several projects at the University of Alcalá de Henares
- Degree in Industrial Technologies Engineering from the University of Valladolid
- Professional Master's Degree in Industrial Engineering from the University of Valladolid
- Collaborator in several scientific publications

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

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

The program of this Postgraduate Diploma has been developed by a teaching staff of international prestige, with extensive experience in the Manufacture and Integration of Mechatronic Systems. Thanks to this, the training is characterized by having the most updated materials in the mechatronics sector. Throughout 3 modules, the graduates will broaden their knowledge and acquire competencies to develop professionally in the sector.

The teaching materials of this Postgraduate Diploma are prepared by prestigious experts who will guarantee that your learning will be successful"

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. Embedded Systems

2.1. Embedded Systems in Engineering
- 2.1.1. Embedded Systems
- 2.1.2. Embedded systems in engineering
- 2.1.3. Importance of Embedded Systems in Modern Engineering

2.2. Microcontrollers
- 2.2.1. Microcontrollers
- 2.2.2. Differences between Microcontrollers and Development Boards
- 2.2.3. Microcontrollers and Development Boards
- 2.2.4. Programming Languages for Microcontrollers

2.3. Sensors and Actuators
- 2.3.1. Industrial Sensors
- 2.3.2. Industrial Actuators
- 2.3.3. Communication between Sensors and the Central Unit
- 2.3.4. Actuator Control in Embedded Systems

2.4. Embedded Systems for Real-Time Control
- 2.4.1. *Hard Real Time* System
- 2.4.2. *Soft Real Time* System
- 2.4.3. Programming of Real Time Systems

2.5. Embedded Digital Signal Processing Systems
- 2.5.1. Digital Signal Processing (DSP)
- 2.5.2. Design of DSP Algorithms in Embedded Systems
- 2.5.3. Applications of DSP in Engineering by Means of Embedded Systems

2.6. Programmable Hardware in Embedded Systems
- 2.6.1. Programmable Logic and FPGAs
- 2.6.2. Design of Logic Circuits in Programmable Hardware
- 2.6.3. Programmable Hardware Technologies

2.7. Single Board Computers (SBC)
- 2.7.1. Parts of Single Board Computers
- 2.7.2. Main Architectures
- 2.7.3. Single-board Computers vs. Desktop Computers

2.8. *Embedded Systems in the Internet of Things (IoT)*
- 2.8.1. *Internet of things* (IoT)
- 2.8.2. Integration of Embedded Systems in the IoT
- 2.8.3. Sensors and IoT Devices
- 2.8.4. Use Cases and Practical Applications

2.9. Security and Reliability in Embedded Systems
- 2.9.1. Threats and Vulnerabilities in Embedded Systems
- 2.9.2. Secure Design and Coding Practices
- 2.9.3. Maintenance and Security Updates

2.10. Embedded Systems Communication and Connectivity
- 2.10.1. Communication Protocols for Embedded Systems
- 2.10.2. Sensor Networks and Wireless Communication
- 2.10.3. Integration with the Internet and the Cloud

Module 3. Mechatronic Systems Integration

3.1. Integrated Manufacturing Systems
- 3.1.1. Integrated Manufacturing Systems
- 3.1.2. Industrial Communications in Systems Integration
- 3.1.3. Integration of Control Equipment in the Production Processes
- 3.1.4. New Production Paradigm: Industry 4.0

3.2. Industrial Communication Networks
- 3.2.1. Industrial Communications. Evolution
- 3.2.2. Structure of Industrial Networks
- 3.2.3. Current Situation of Industrial Communications

3.3. Communication Networks at the Process Interface Level
- 3.3.1. AS-i: Elements
- 3.3.2. IO-Link: Elements
- 3.3.3. Integration of Equipment
- 3.3.4. Selection Criteria
- 3.3.5. Application Examples

3.4. Communication Networks at the Control and Regulation Level
- 3.4.1. Communication Networks at the Command and Control Level
- 3.4.2. Profibus: Elements
- 3.4.3. Canbus: Elements
- 3.4.4. Equipment Integration
- 3.4.5. Selection Criteria
- 3.4.6. Application Examples

3.5. Communication Networks at Centralized Supervisory and Command Level
- 3.5.1. Centralized Supervisory and Command Level Networks
- 3.5.2. Profinet: Elements
- 3.5.3. Ethercat: Elements
- 3.5.4. Equipment Integration
- 3.5.5. Application Examples

3.6. Process Monitoring and Control Systems
- 3.6.1. Process Monitoring and Control Systems
- 3.6.2. Human Machine Interfaces (HMIs)
- 3.6.3. Examples of Use

3.7. Operator Panels
- 3.7.1. The Operator Panel as a Human-machine Interface
- 3.7.2. Membrane Panels
- 3.7.3. Touch Panels
- 3.7.4. Communication Possibilities of the Operator Panels
- 3.7.5. Selection Criteria
- 3.7.6. Application Examples

3.8. SCADA Packages
- 3.8.1. SCADA Packages as Man-machine Interface
- 3.8.2. Selection Criteria
- 3.8.3. Application Examples

3.9. Industry 4.0. Intelligent Manufacturing
- 3.9.1. Industry 4.0
- 3.9.2. Architecture of the New Factories
- 3.9.3. Industry 4.0 Technologies

3.10. Examples of Manufacturing based on Industry 4.0
- 3.10.1. Example of Application of Equipment Integration in an Automated Process
- 3.10.2. Description of the Process to be Automated
- 3.10.3. Selection of Control Equipment
- 3.10.4. Integration of Equipment

Revolutionize the Mechatronics sector thanks to the skills and techniques you will acquire in this Postgraduate Diploma"

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 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

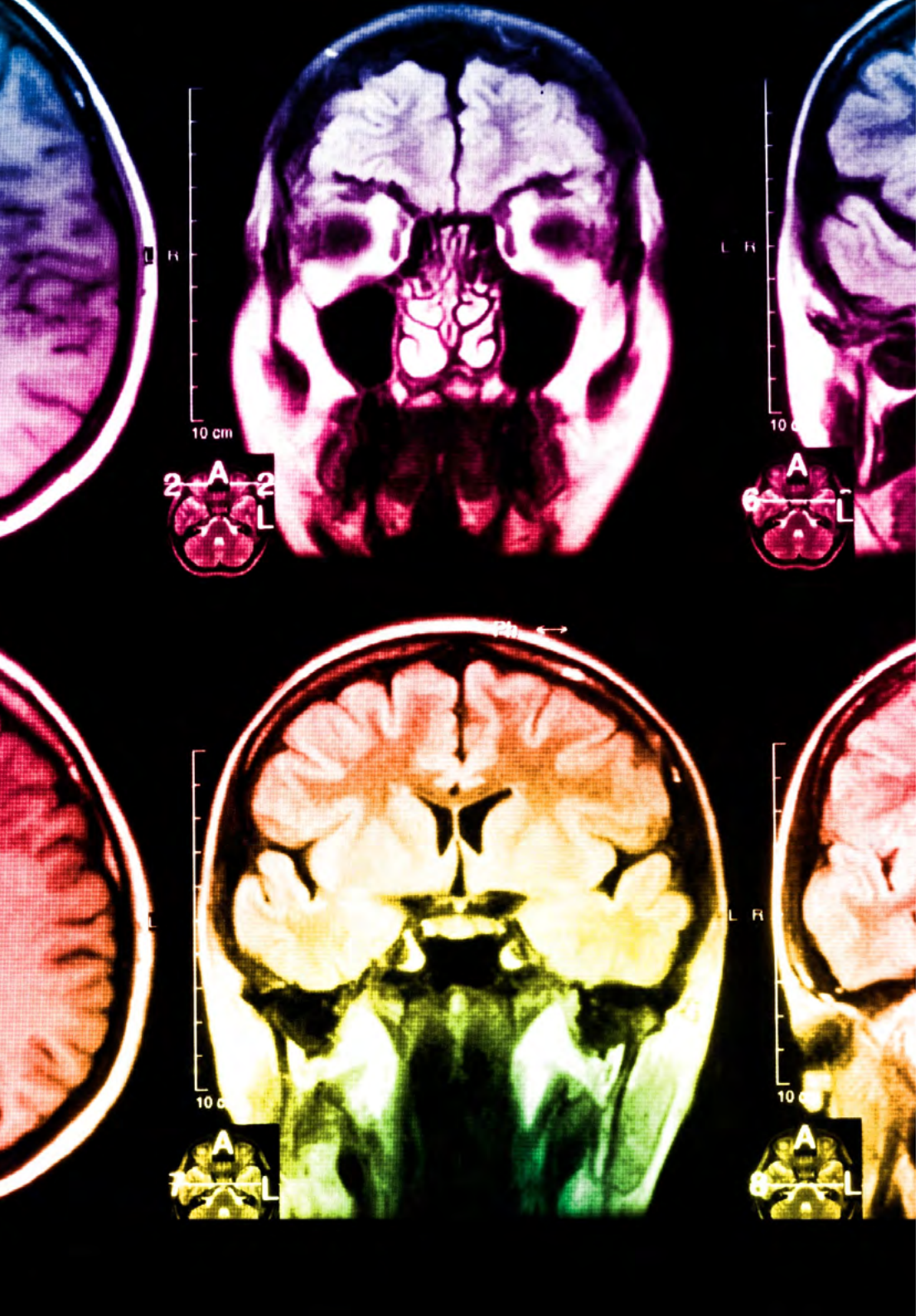
TECH effectively combines the Case Study methodology with a 100% online learning system based on repetition, which combines 8 different teaching elements in each lesson.

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.

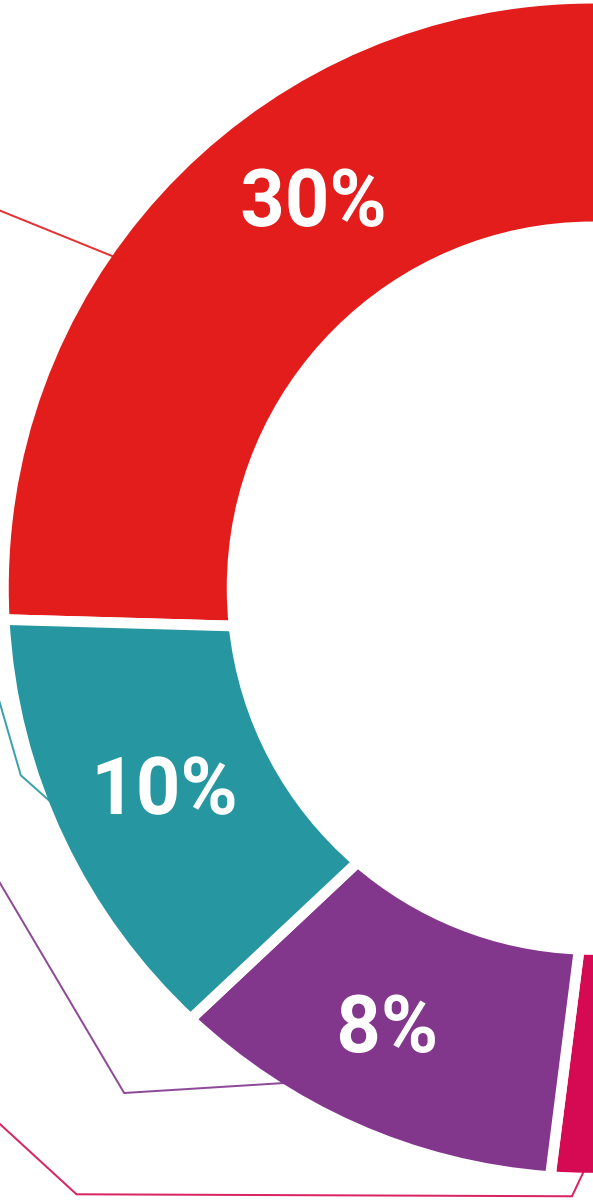
Learning from an Expert strengthens knowledge and memory, and generates confidence in future difficult decisions.

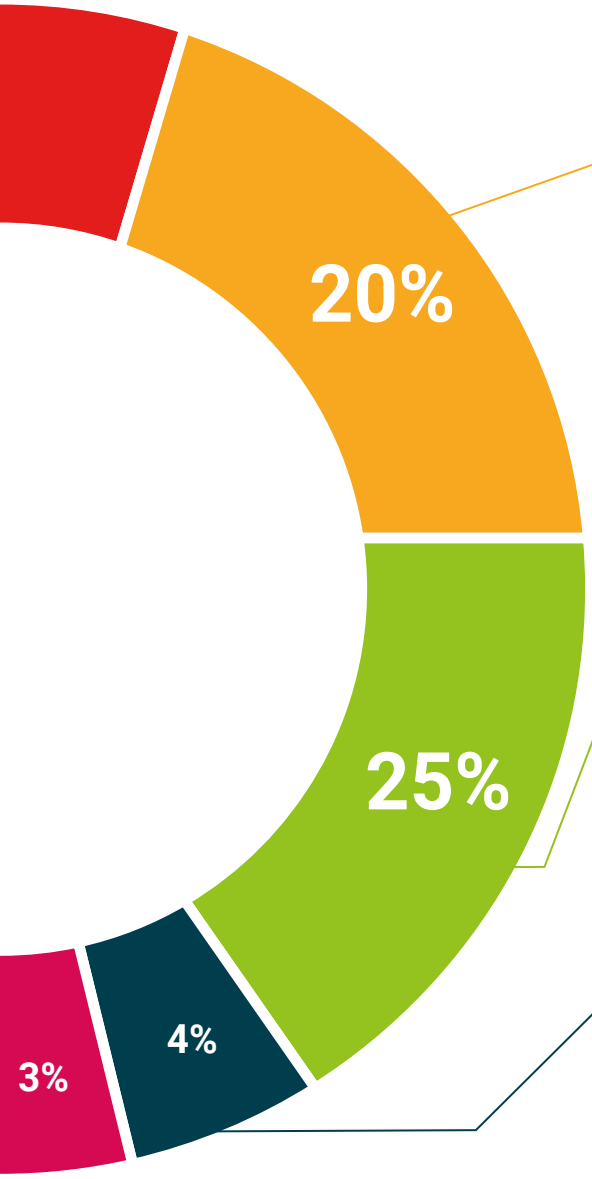
Practising Skills and Abilities

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 Manufacturing and Integration 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 Manufacturing and Integration 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 Diploma in Manufacturing and Integration of Mechatronic Systems**

Official Nº of Hours: **450 h.**


tech technological university

Awards the following

CERTIFICATE

to

Mr./Ms. _____, with identification number _____.

For having passed and accredited the following program

POSTGRADUATE DIPLOMA

in

Manufacturing and Integration of Mechatronic Systems

This is a qualification awarded by this University, equivalent to 450 hours, with a start date of dd/mm/yyyy and an end date of dd/mm/yyyy.

TECH is a Private Institution of Higher Education recognized by the Ministry of Public Education as of June 28, 2018.

June 17, 2020

Tere Guevara Navarro

Dean

This qualification must always be accompanied by the university degree issued by the competent authority to practice professionally in each country. Unique TECH Code: AFWORD23S techtitute.com/certificates

*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.

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