Postgraduate Certificate
Advanced Robotics applied to Mechatronics

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Postgraduate Certificate
Advanced Robotics applied to Mechatronics

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

Website: **www.techtitute.com/us/engineering/postgraduate-certificate/advanced-robotics-mechatronics**

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01
Introduction

Advanced Robotics has positioned itself as a disruptive element in many sectors. In the field of Mechatronics, it has offered numerous automated solutions in industries such as automotive or aviation. Therefore, the preparation of professionals who master this area is a priority for TECH, which has designed this educational program taking into account the latest advances in this field. In this way, this program guarantees that graduates will be able to successfully face the constant changes that are taking place in the technological panorama. The 100% online methodology with which it is developed, in addition, will allow them to study at their own pace, without imposed schedules.

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Thanks to this Postgraduate Certificate you will specialize in the application of Advanced Robotics in Mechatronics"

Robotics has had a great impact that has allowed it to be introduced in numerous professional sectors. Its use generates numerous advantages such as increasing productivity, efficiency and profitability of companies. In view of this, more and more companies are demanding expert profiles in robotics in order to incorporate these technologies into their production processes. Aware of the importance of having professionals with a high level of specialization, TECH has implemented a study program that contains the most advanced concepts and activities related to Advanced Robotics applied to Mechatronics.

The didactic resources of this program will allow to delve into the operation and application of robots to industrial processes. Also, with the 100% online methodology of this program, graduates will be able to complete the program with ease. To study the materials, they will only need a device with Internet access, since the schedules and evaluation timetables can be planned individually.

In addition, the syllabus will be supported 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.

This **Postgraduate Certificate in Advanced Robotics Applied to Mechatronics** 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 Advanced Robotics applied to Mechatronics
- 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

TECH will allow you to study with the best teachers, deepening your knowledge of Advanced Robotics with the help of prestigious professionals"

" *You will have at your fingertips the best didactic resources: interactive summaries, practical activities, detailed videos, etc"*

The 100% online methodology with which this program is developed will allow you to combine your studies with the rest of your professional and personal activities.

Delve into the programming of robots oriented to the field of mechatronics thanks to this Postgraduate Certificate.

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

Taking into account the great boom of Robotics and Mechatronics in the industrial sector, the main objective of this Postgraduate Certificate is to prepare the professional to master the most advanced tools in these areas. Therefore, throughout this educational itinerary, the student will be trained to apply advanced robotics in industrial sectors of great importance such as automotive or aviation. And they will do so by means of the best pedagogical resources available in the educational market.

The objective of this Postgraduate Certificate is to offer you a high-level professional preparation in the field of Mechatronics and Advanced Robotics"

General Objectives

- Present the elements that make up a robotic system
- Analyze the mathematical models used in the analysis and design of a robot.
- Develop control methods used in a robot
- Present the programming languages used in various industrial robots

"Master the most advanced tools and techniques in Advanced Robotics. Enroll now"

Specific Objectives

- Identify the components that are part of a robot
- Fundamentals of the mathematical principles used in the study of the kinematics and dynamics of a robot
- Specify the mechanical formulation used in the analysis and design of a robot
- Develop the trajectory planning techniques used in kinematic control
- Analyze the linear dynamic control of a DC motor

03

Course Management

This Postgraduate Certificate has a teaching staff of great prestige in the field of Robotics. Thanks to this, the student will be able to learn from the best professionals. Authentic experts with a great experience in Mechatronics and who know the sector in detail, so that at the end of the program the student will acquire the skills most in demand by large industrial companies.

Study with the greatest experts in Mechatronics. Enroll and delve into the application of Advanced Robotics in the industrial 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

- 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"

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 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. Elvira Izurrategui, Carlos
- Specialist in Electrical Engineering and Systems and Automation Engineering
- Deputy Director of the Industrial Engineering Section of the Center for Scientific and Technical Education of the University of La Rioja
- Director of the Center for Scientific and Technical Education of the University of La Rioja.
- University Professor in various Master's and Degree programs
- Industrial Engineer from the University of Cantabria
- Industrial Technical Engineer (specializing in Electricity) from the University of Zaragoza
- Director of several teaching research projects

04
Structure and Content

This Postgraduate Certificate provides advanced training in Robotics Applied to Mechatronics. The student will be able to master aspects such as robot vision systems, through programming, to kinematics of position and orientation. In this way, the student will receive a complete and current preparation on these areas, becoming a professional up to date with the latest tools in the industrial sector.
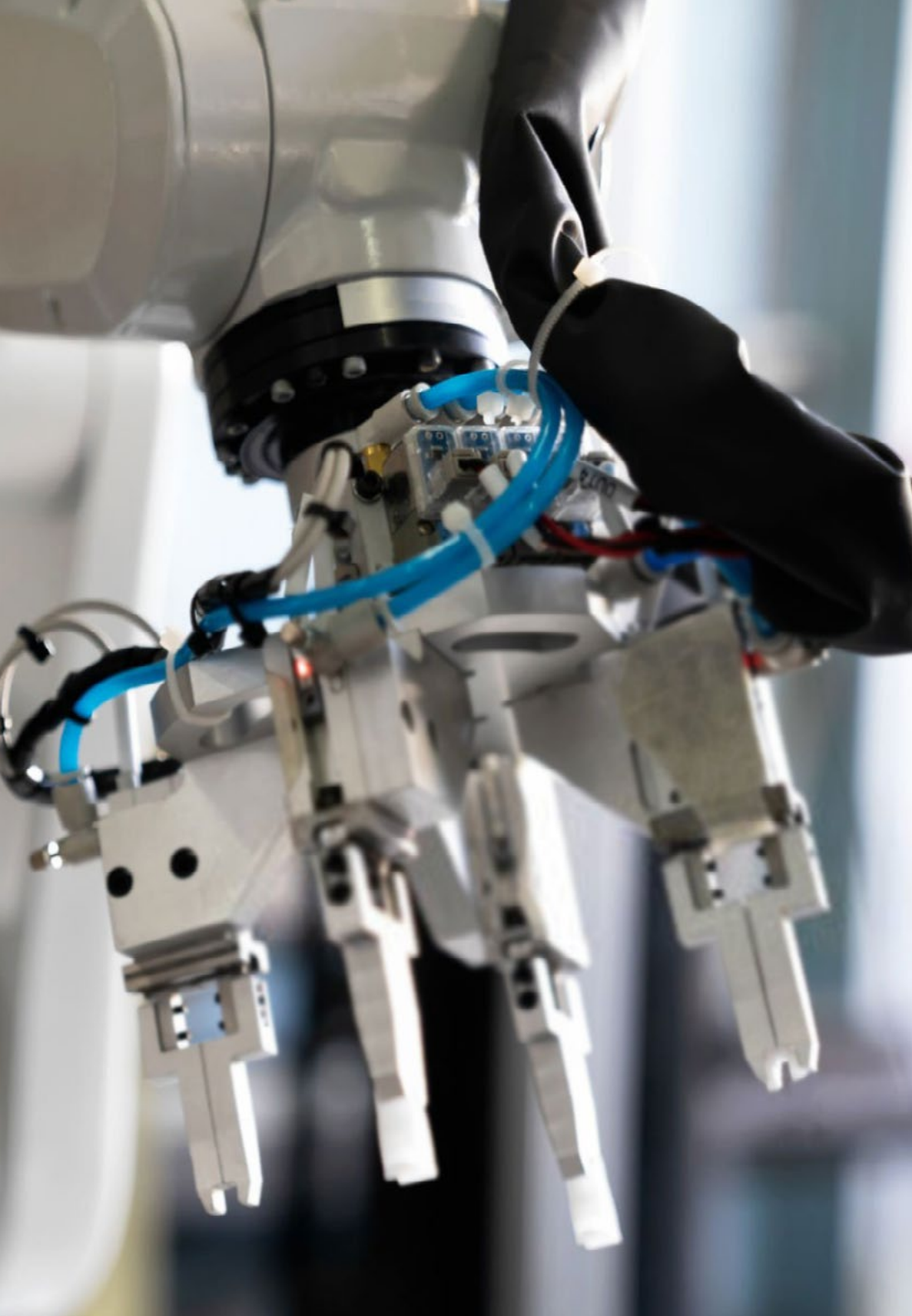
This Postgraduate Certificate has the most complete and up to date syllabus in the area of Advanced Robotics applied to Mechatronics"

Module 1. Robotics applied to Mechatronics Engineering

1.1   The Robot
  1.1.1.   The Robot
  1.1.2.   Application of Robots
  1.1.3.   Classification of Robots
  1.1.4.   Mechanical structure of a robot
  1.1.5.   Specifications of a Robot
1.2   Technological Components
  1.2.1.   Electric, pneumatic and hydraulic actuators
  1.2.2.   Sensors internal and external to the robot
  1.2.3.   Vision Systems
  1.2.4.   Selection of motors and sensors
  1.2.5.   Terminal elements and grippers
1.3   Transformations
  1.3.1.   Robot architecture
  1.3.2.   Position and orientation of a solid
  1.3.3.   Euler orientation angles
  1.3.4.   Homogeneous transformation matrixes
1.4   Kinematics of position and orientation
  1.4.1.   Denavit-Hartenberg formulation
  1.4.2.   Direct Kinematic Problem
  1.4.3.   Inverse Kinematic Problem
1.5   Kinematics of velocities and accelerations
  1.5.1.   Speed and Acceleration of a solid
  1.5.2.   Jacobian matrix
  1.5.3.   Singular configurations
1.6   Statics
  1.6.1.   Force and moment equilibrium equations
  1.6.2.   Calculation of statics. Recursive method
  1.6.3.   Static analysis using the Jacobian matrix

This program combines the best online teaching methodology with a teaching staff made up of experts in Mechatronics"

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.

01 learning from evidence

02 relearning from evidence

03 testing

04 learning from an expert

05 neurocognitive context dependent learning

06 Von-Restorff effect

07 case based learning through storytelling

08 competencies testing (retesting)

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.

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20%

25%

4%

3%

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 Advanced Robotics applied to Mechatronics guarantees you, in addition to the most rigorous and updated training, access to a Executive Master's Degree issued by TECH Global University.

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 Advanced Robotics applied to Mechatronics** 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 Advanced Robotics applied to Mechatronics**

Modality: **online**

Duration: **6 weeks**

Accreditation: **6 ECTS**

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Mr./Ms. _____, with identification document _____ has successfully passed and obtained the title of:

Postgraduate Certificate in Advanced Robotics applied to Mechatronics

This is a program of 180 hours of duration equivalent to 6 ECTS, with a start date of dd/mm/yyyy and an end date of dd/mm/yyyy.

TECH Global University is a university officially recognized by the Government of Andorra on the 31st of January of 2024, which belongs to the European Higher Education Area (EHEA).

In Andorra la Vella, on the 28th of February of 2024

Dr. Pedro Navarro Illana
Rector

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 diploma issued with an apostille, TECH Global University will make the necessary arrangements to obtain it, at an additional cost.

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