



# Postgraduate Diploma Digital Design and Manufacturing with Artificial Intelligence

» Modality: online

» Duration: 6 months

» Certificate: TECH Global University

» Accreditation: 18 ECTS

» Schedule: at your own pace

» Exams: online

Website: www.techtitute.com/us/artificial-intelligence/postgraduate-diploma/postgraduate-diploma-digital-design-manufacturing-artificial-intelligence

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## tech 06 | Introduction

According to a recent report by the World Economic Forum, over the next few years 45% of activities in the construction sector will be automated thanks to emerging technologies such as Artificial Intelligence or robotics. Faced with this reality, architects must adopt new design methodologies with the aim of optimizing the efficiency and sustainability of their projects. For example, by employing Digital Fabrication, specialists develop components with millimeter accuracy. In this way, material waste is minimized and more sustainable constructions are promoted.

In this context, TECH presents a revolutionary program in Digital Design and Manufacturing with Artificial Intelligence. Designed by references in this field, the academic itinerary will delve into issues ranging from parametric design with Geomagic Wrap or predictive analysis with CATIA to the application of SketchUp to obtain detailed energy assessments. In addition, the curriculum will delve into the use of Verdigris to ensure that professionals carry out sustainable practices. The course materials will also address cutting-edge methodologies to improve both innovation and efficiency in collaborative design projects. In this way, graduates will acquire advanced skills to use digital tools and Artificial Intelligence algorithms to generate exclusive and creative designs.

Moreover, the university program is taught in a 100% online mode, which gives architects the opportunity to access the content from anywhere and at any time, adapting the study to their schedules. In addition, TECH employs its revolutionary learning method: Relearning. This system consists of the repetition of key concepts to fix knowledge and facilitate lasting learning. In this sense, the only thing students will need is an electronic device with Internet access to access the Virtual Campus, where they will find a library full of disruptive multimedia resources.

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

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



The interactive summaries of each module will allow you to reinforce the concepts of parametric design efficiency in a more dynamic way"



Are you looking to use Artificial Intelligence tools to reduce the environmental impact of architectural projects? Achieve it through this university program in only 6 months"

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.

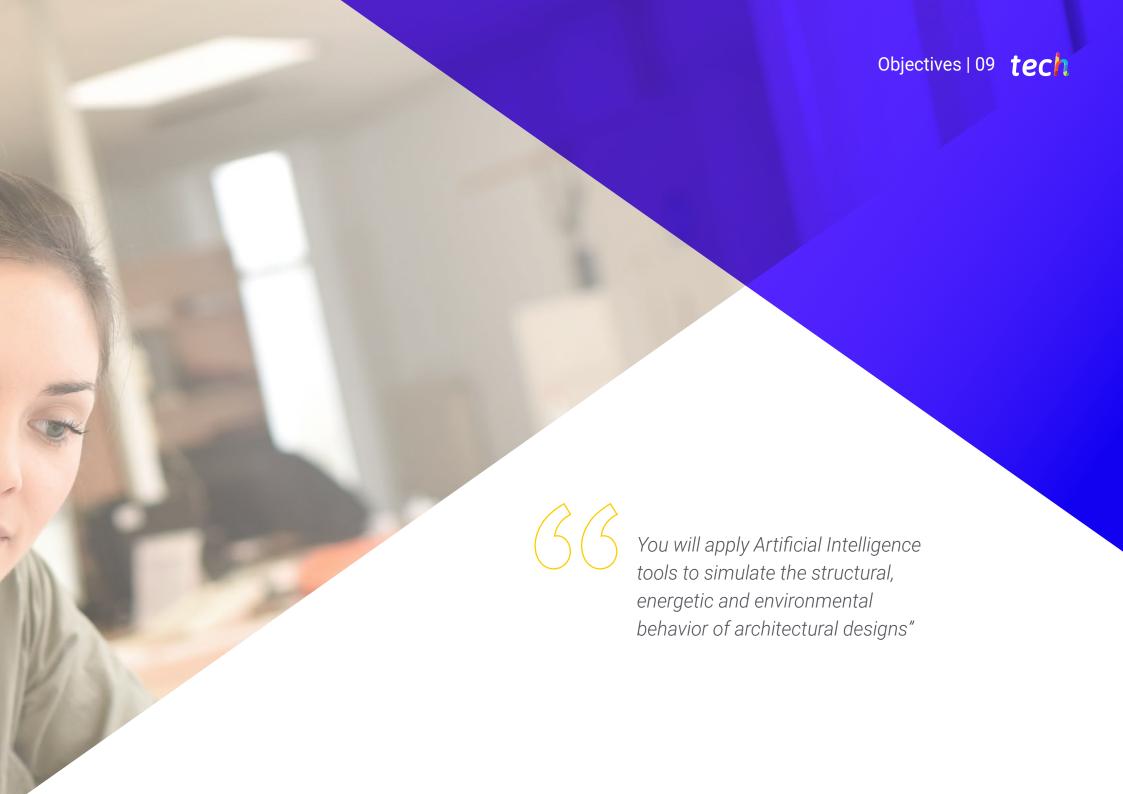
This program is designed around Problem-Based Learning, whereby the professional must try to solve the different professional practice situations that arise during the course. For this purpose, students will be assisted by an innovative interactive video system created by renowned experts in the field of educational coaching with extensive experience.

You will incorporate intelligent technologies in your buildings such as automated lighting systems, intelligent air conditioning and sustainable materials.

TECH's Relearning system will allow you to learn with less effort and more performance, involving you more in your professional specialization.







## tech 10 | Objectives



## **General Objectives**

- Understand the theoretical foundations of Artificial Intelligence
- Study the different types of data and understand the data lifecycle
- Evaluate the crucial role of data in the development and implementation of Al solutions
- Delve into algorithms and complexity to solve specific problems
- Explore the theoretical basis of neural networks for Deep Learning development
- Explore bio-inspired computing and its relevance in the development of intelligent systems
- Manage advanced Artificial Intelligence tools to optimize architectural processes such as parametric design
- Apply Generative Modeling techniques to maximize efficiency in infrastructure planning and improve the energy performance of buildings



With the highest rated learning assistance methods in online teaching, this university program will allow you to learn in a fluid, constant and effective manner"







## **Specific Objectives**

### Module 1. Al-Assisted Design in Architectural Practice

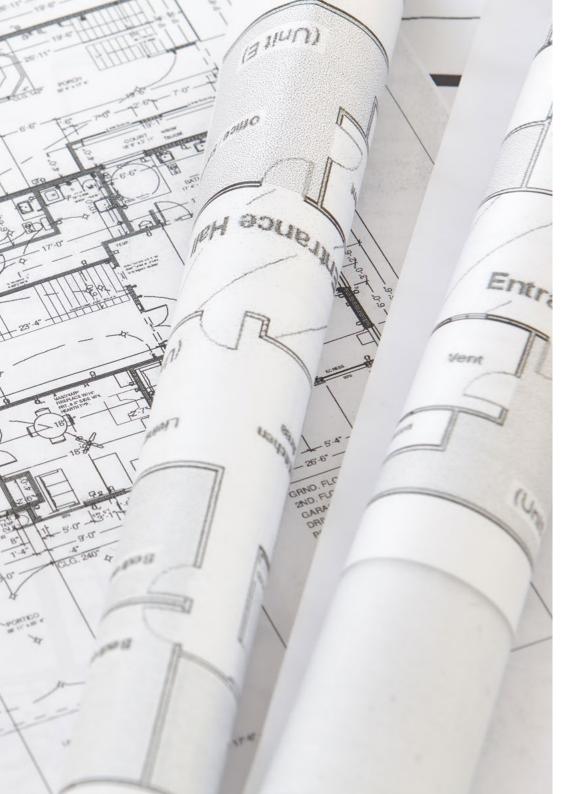
- Utilize AutoCAD and Fusion 360 software to create generative and parametric models that optimize the architectural design process
- Have a holistic understanding of ethical principles in the use of AI in design, ensuring that architectural solutions are both responsible and sustainable

#### Module 2. Space Optimization and Energy Efficiency with AI

- Implement bioclimatic design strategies and Al-assisted technologies to improve the energy efficiency of architectural initiatives
- Acquire skills in the use of simulation tools to improve energy efficiency in urban planning and architecture

#### Module 3. Parametric Design and Digital Manufacturing

- Handle tools such as Grasshopper and Autodesk 360 to create adaptive and customized designs that meet customers' expectations
- Apply topological optimization and sustainable design strategies in parametric projects







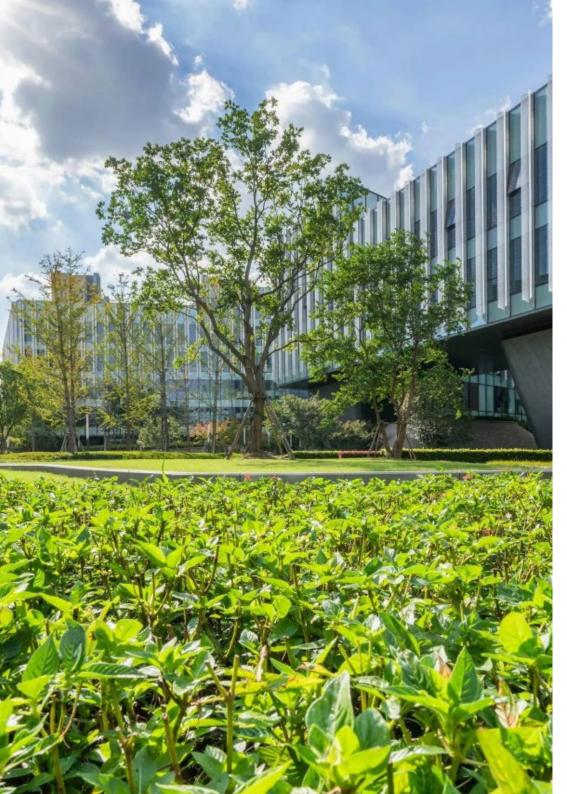
## tech 14 | Course Management

## Management



## Dr. Peralta Martín-Palomino, Arturo

- CEO and CTO at Prometeus Global Solutions
- CTO at Korporate Technologies
- CTO at AI Shepherds GmbH
- Consultant and Strategic Business Advisor at Alliance Medical
- Director of Design and Development at DocPath
- PhD in Psychology from the University of Castilla La Mancha
- PhD in Economics, Business and Finance from the Camilo José Cela University
- PhD in Psychology from University of Castilla La Mancha
- Master's Degree in Executive MBA from the Isabel I University
- Master's Degree in Sales and Marketing Management, Isabel I University
- Expert Master's Degree in Big Data by Hadoop Training
- Master's Degree in Advanced Information Technologies from the University of Castilla La Mancha
- Member of: SMILE Research Group



## Course Management | 15 tech

#### **Professors**

#### Mr. Peralta Vide, Javier

- Technological Coordinator and Content Developer at Aranzadi Laley Formación
- Collaborator at CanalCreativo
- Collaborator at Dentsu
- Collaborator at Ai2
- Collaborator at BoaMistura
- Freelance Architect at Editorial Nivola, Biogen Technologies, Releaf, etc.
- Specialization by Revit Architecture Metropa School
- Graduate in Architecture and Urbanism from the University of Alcalá

#### Ms. Martínez Cerrato, Yésica

- Responsible for Technical Training at Securitas Seguridad España
- Education, Business and Marketing Specialist
- Product Manager in Electronic Security at Securitas Seguridad España
- Business Intelligence Analyst at Ricopia Technologies
- Computer Technician and Responsible for OTEC computer classrooms at the University of Alcalá de Henares
- Collaborator in the ASALUMA Association
- Degree in Electronic Communications Engineering at the Polytechnic School, University of Alcalá de Henares





## tech 18 | Structure and Content

## Module 1. Al-Assisted Design in Architectural Practice

- 1.1. Advanced AutoCAD Applications with Al
  - 1.1.1. Integration of AutoCAD with Al Tools for Advanced Design
  - 1.1.2. Automation of Repetitive Tasks in Architectural Design with Al
  - 1.1.3. Case Studies Where Al-Assisted AutoCAD Has Optimized Architectural Projects
- 1.2. Advanced Generative Modeling with Fusion 360
  - 1.2.1. Advanced Generative Modeling Techniques Applied to Complex Projects
  - 1.2.2. Using Fusion 360 to Create Innovative Architectural Designs
  - 1.2.3. Examples of Applying Generative Modeling in Sustainable and Adaptive Architecture
- 1.3. Optimizing Designs with AI in Optimus
  - 1.3.1. Optimization Strategies for Architectural Design Optimization Using Al Algorithms in Optimus
  - 1.3.2. Sensitivity Analysis and Exploration of Optimal Solutions in Real Projects
  - 1.3.3. Review of Industry Success Stories Using Optimus for Al-Based Optimization
- 1.4. Parametric Design and Digital Fabrication with Geomagic Wrap
  - 1.4.1. Advances in Parametric Design with AI Integration Using Geomagic Wrap
  - 1.4.2. Practical Applications of Digital Fabrication in Architecture
  - 1.4.3. Outstanding Architectural Projects Using Al-Assisted Parametric Design for Structural Innovations
- 1.5. Al-Assisted Parametric Design for Structural Innovations
  - 1.5.1. Adaptive and Context Sensitive Design with Al Sensors
  - 1.5.2. Implementing Adaptive Design Using Al and Real-Time Data
  - 1.5.3. Examples of Ephemeral Architecture and Urban Environments Designed with Al
- 1.6. Analysis of How Adaptive Design Influences the Sustainability and Efficiency of Architectural Projects
  - 1.6.1. Simulation and Predictive Analytics in CATIA for Architects
  - 1.6.2. Advanced Use of CATIA for Architectural Simulation
  - 1.6.3. Implementing Predictive Analytics in Significant Architectural Projects



## Structure and Content | 19 tech

- 1.7. Personalization and UX in Design with IBM Watson Studio
  - 1.7.1. IBM Watson Studio's AI Tools for Architectural Personalization
  - 1.7.2. User-Centered Design Using Al Analytics
  - 1.7.3. Case Studies of AI Use Cases for Personalization of Architectural Spaces and Products
- 1.8. Collaboration and Collective Design Powered by Al
  - 1.8.1. Al-Powered Collaborative Platforms for Design Projects
  - 1.8.2. Al Methodologies that Foster Creativity and Collective Innovation
  - 1.8.3. Success Stories and Challenges in Al-Assisted Collaborative Design
- 1.9. Ethics and Responsibility in Al-Assisted Design
  - 1.9.1. Ethical Debates in the Use of AI in Architectural Design
  - 1.9.2. Study on Biases and Fairness in Al Algorithms Applied to Design
  - 1.9.3. Current Regulations and Standards for Responsible Al Design
- 1.10. Challenges and Future of Al-Assisted Design
  - 1.10.1. Emerging Trends and Cutting-Edge Technologies in AI for Architecture
  - 1.10.2. Analysis of the Future Impact of AI on the Architectural Profession
  - 1.10.3. Foresight on Future Innovations and Developments in Al-Assisted Design

#### Module 2. Space Optimization and Energy Efficiency with Al

- 2.1. Optimizing Spaces with Autodesk Revit and Al
  - 2.1.1. Using Autodesk Revit and AI for Spatial Optimization and Energy Efficiency
  - 2.1.2. Advanced Techniques for Improving Energy Efficiency in Architectural Designs
  - 2.1.3. Case Studies of Successful Projects Combining Autodesk Revit with Al
- 2.2. Analysis of Energy Efficiency Metrics and Data with SketchUp and Trimble
  - 2.2.1. Applying SketchUp and Trimble Tools for Detailed Energy Analysis
  - 2.2.2. Developing Energy Efficiency Metrics Using Al
  - 2.2.3. Strategies for Setting Energy Efficiency Goals for Architectural Projects
- 2.3. Bioclimatic Design and Al-Optimized Solar Orientation
  - 2.3.1. Al-Assisted Bioclimatic Design Strategies for Maximizing Energy Efficiency
  - 2.3.2. Examples of Buildings Using Al-Guided Design to Optimize Thermal Comfort
  - 2.3.3. Practical Applications of AI in Solar Orientation and Passive Design

- 2.4. Al-Assisted Sustainable Materials and Technologies with Cityzenit
  - 2.4.1. Innovation in Sustainable Materials Supported by Al Analysis
  - 2.4.2. Using AI to Develop and Apply Recycled and Low-Environmental-Impact Materials
  - 2.4.3. Study of Projects Using Renewable Energy Systems Integrated with Al
- 2.5. Urban Planning and Energy Efficiency with WattPredictor and Al
  - 2.5.1. Al Strategies for Energy Efficiency in Urban Design
  - 2.5.2. Implementing WattPredictor to Optimize Energy Use in Public Spaces
  - 2.5.3. Successful Cases of Cities Using AI to Improve Urban Sustainability
- 2.6. Intelligent Energy Management with Google DeepMind's Energy
  - 2.6.1. Applications of DeepMind Technologies for Energy Management
  - 2.6.2. Implementing AI for Energy Consumption Optimization
  - 2.6.3. Assessment of Cases Where AI Has Transformed Energy Management in Communities and Buildings
- 2.7. Al-Assisted Energy Efficiency Certifications and Regulations
  - 2.7.1. Using AI to Ensure Compliance with Energy Efficiency Standards (LEED, BREEAM)
  - 2.7.2. Al Tools for Energy Audit and Certification of Projects
  - 2.7.3. Impact of Regulations on Al-Supported Sustainable Architecture
- 2.8. Life Cycle Assessment and Environmental Footprint with Enernoc
  - 2.8.1. Al Integration for Life Cycle Analysis of Building Materials
  - 2.8.2. Using Enernoc to Assess Carbon Footprint and Sustainability
  - 2.8.3. Model Projects Using Al for Advanced Environmental Assessments
- 2.9. Energy Efficiency Education and Awareness with Verdigris
  - 2.9.1. Role of AI in Energy Efficiency Education and Awareness
  - 2.9.2. Using Verdigris to Teach Sustainable Practices to Architects and Designers
  - 2.9.3. Initiatives and Educational Programs Using AI to Promote a Cultural Change Toward Sustainability
- 2.10. Future of Space Optimization and Energy Efficiency with ENBALA
  - 2.10.1. Exploration of Future Challenges and the Evolution of Energy Efficiency Technologies
  - 2.10.2. Emerging Trends in Al for Spatial and Energy Optimization
  - 2.10.3. Perspectives on How AI Will Continue to Transform Architecture and Urban Design

## tech 20 | Structure and Content

#### Module 3. Parametric Design and Digital Manufacturing

- 3.1. Advances in Parametric Design and Digital Manufacturing with Grasshopper
  - 3.1.1. Using Grasshopper to Create Complex Parametric Designs
  - 3.1.2. Integrating Al into Grasshopper to Automate and Optimize Design
  - 3.1.3. Flagship Projects Using Parametric Design for Innovative Solutions
- 3.2. Algorithmic Optimization in Design with Generative Design
  - 3.2.1. Application of Generative Design for Algorithmic Optimization in Architecture
  - 3.2.2. Using AI to Generate Efficient and Novel Design Solutions
  - 3.2.3. Examples of How Generative Design Has Improved the Functionality and Aesthetics of Architectural Projects
- 3.3. Digital Fabrication and Robotics in Construction with KUKA PRC
  - 3.3.1. Implementing Robotics Technologies such as KUKA PRC in Digital Manufacturing
  - 3.3.2. Advantages of Digital Manufacturing in Precision, Speed and Cost Reduction
  - 3.3.3. Digital Manufacturing Case Studies Highlighting Successful Integration of Robotics in Architecture
- 3.4. Adaptive Design and Manufacturing with Autodesk Fusion 360
  - 3.4.1. Using Fusion 360 to Design Adaptive Architectural Systems
  - 3.4.2. Implementing AI in Fusion 360 for Mass Customization
  - 3.4.3. Innovative Projects Demonstrating the Potential for Adaptability and Customization
- 3.5. Sustainability in Parametric Design with Topology Optimization
  - 3.5.1. Applying Topology Optimization Techniques to Improve Sustainability
  - 3.5.2. Integrating AI to Optimize Material Usage and Energy Efficiency
  - 3.5.3. Examples of How Topological Optimization Has Improved the Sustainability of Architectural Projects
- 3.6. Interactivity and Spatial Adaptability with Autodesk Fusion 360
  - 3.6.1. Integrating Real-Time Data and Sensors to Create Interactive Architectural Environments
  - 3.6.2. Using Autodesk Fusion 360 in Adapting Design in Response to Environmental or Usage Changes
  - 3.6.3. Examples of Architectural Projects Using Spatial Interactivity to Improve User Experience

- 3.7. Efficiency in Parametric Design
  - 3.7.1. Applying Parametric Design to Optimize Sustainability and Energy Efficiency of Buildings
  - 3.7.2. Using Simulations and Life Cycle Analysis Integrated with AI to Improve Green Decision-Making
  - 3.7.3. Cases of Sustainable Projects Where Parametric Design Has Been Crucial
- 3.8. Mass Customization and Digital Manufacturing with Magic (Materialise)
  - 3.8.1. Exploring the Potential of Mass Customization through Parametric Design and Digital Manufacturing
  - 3.8.2. Applying Tools such as Magic to Customize Architectural and Interior Design
  - 3.8.3. Outstanding Projects Showcasing Digital Fabrication in the Customization of Spaces and Furniture
- 3.9. Collaboration and Collective Design Using Ansys Granta
  - 3.9.1. Using Ansys Granta to Facilitate Collaboration and Decision Making in Distributed Design
  - 3.9.2. Methodologies to Improve Innovation and Efficiency in Collaborative Design Projects
  - 3.9.3. Examples of How Al-Enhanced Collaboration Can Lead to Innovative and Sustainable Results
- 3.10. Challenges and the Future of Digital Manufacturing and Parametric Design
  - 3.10.1. Identifying Emerging Challenges in Parametric Design and Digital Manufacturing
  - 3.10.2. Future Trends and the Role of Al in the Evolution of These Technologies
  - 3.10.3. Discussion of How Continuous Innovation Will Affect Architectural Practice and Design in the Future

## Structure and Content | 21 tech





A complete syllabus that incorporates all the knowledge you need to take a step towards the highest quality as an architect. What are you waiting for to enroll?"





## tech 24 | Methodology

## Case Study to contextualize all content

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



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



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



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

## A learning method that is different and innovative

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



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

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

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



## Relearning Methodology

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

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

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

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

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



## Methodology | 27 tech

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.



20% 25%

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.



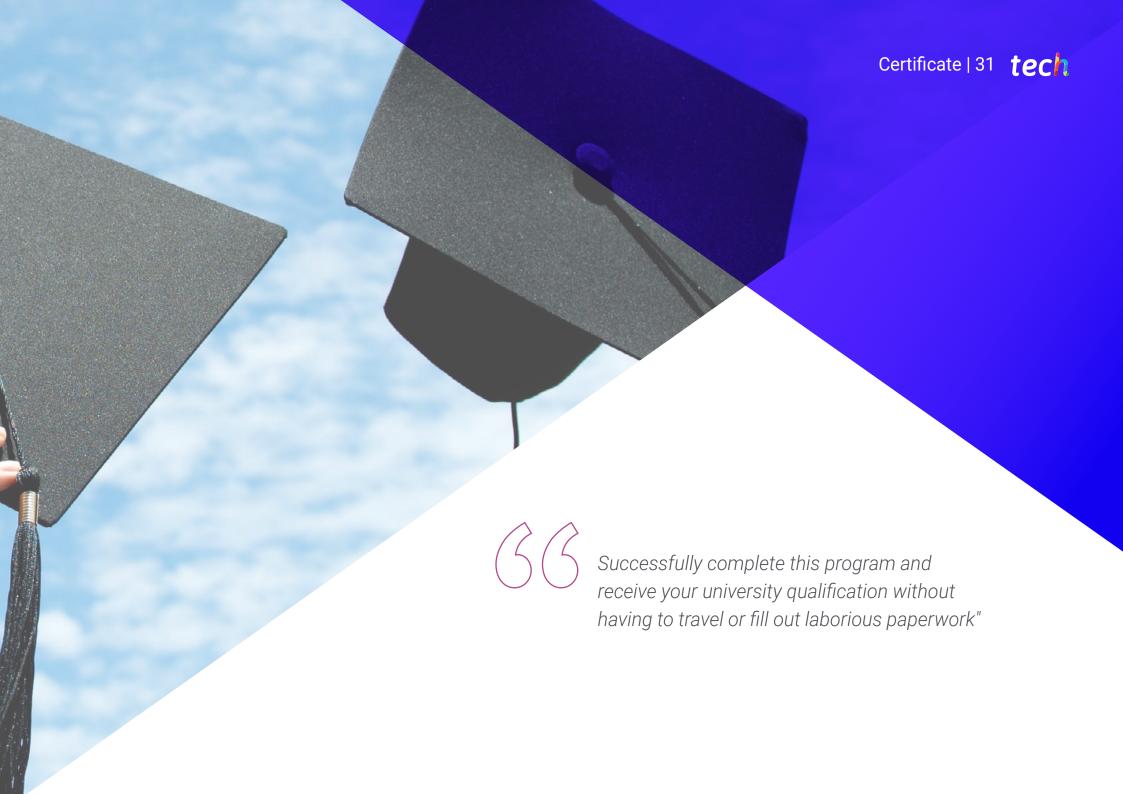
This exclusive educational system for presenting multimedia content was awarded by Microsoft as a "European Success Story".

## **Testing & Retesting**

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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.





## tech 32 | Certificate

This private qualification will allow you to obtain a Postgraduate Diploma in Digital Design and Manufacturing with Artificial Intelligence 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** private qualification, 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 Diploma in Digital Design and Manufacturing with Artificial Intelligence

Modality: online

Duration: 6 months

Accreditation: 18 ECTS



## Artificial Intelligence

This is a private qualification of 540 hours of duration equivalent to 18 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



<sup>\*</sup>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

health confidence people
education information tutors
guarantee accreditation teaching
institutions technology learning
community commitment



Postgraduate Diploma
Digital Design and Manufacturing
with Artificial Intelligence

- » Modality: online
- » Duration: 6 months
- » Certificate: TECH Global University
- » Accreditation: 18 ECTS
- » Schedule: at your own pace
- » Exams: online

