Postgraduate Certificate

Parametric Design and Digital Manufacturing

tech global university

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Postgraduate Certificate
Parametric Design and Digital Manufacturing

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

Website: **www.techtitute.com/us/engineering/postgraduate-certificate/parametric-design-digital-manufacturing**

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01

Introduction

Parametric Design and Digital Manufacturing represent a fundamental breakthrough in the field of architecture and design, combining creativity with the power of computational technologies. These tools allow professionals to develop complex and highly accurate models, optimizing the design process through advanced algorithms and tools, such as Rhino, Grasshopper and Autodesk Revit. In addition, through digital manufacturing, abstract concepts are transformed into tangible prototypes, using 3D printing and CNC techniques. In this context, TECH has developed a complete program with a 100% online modality, allowing graduates to adapt it to their own work and personal schedules. It also features the innovative Relearning methodology, a pioneer in this institution.

Thanks to this 100% online Postgraduate Certificate, you will acquire the ability to generate complex shapes and structures through algorithms and parameters based on Artificial Intelligence tools"

Parametric Design and Digital Manufacturing offer professionals an advanced platform to optimize both the development of projects and the efficiency of their execution. Therefore, by using tools such as Rhino and Autodesk Revit, they can automate design processes and generate accurate models that improve the planning and execution of complex infrastructures. In addition, digital manufacturing, through technologies such as 3D printing and CNC, allows to materialize these models with a high level of precision.

This is how this Postgraduate Certificate was created, which will cover a wide range of advanced technologies in Parametric Design and Digital Manufacturing, starting with the use of Grasshopper to create complex models. It will also delve into the integration of Artificial Intelligence to automate and optimize design processes, generating innovative architectural solutions.

Algorithmic optimization through Generative Design, where Artificial Intelligence is used to create efficient and functional designs, will also be addressed. This methodology has been successfully applied in architectural projects, improving their functionality, aesthetics and sustainability. In addition, engineers will analyze how this technology can improve the performance of projects through practical examples and case studies.

Likewise, the academic itinerary will include the use of robotics technologies, such as KUKA PRC, in digital manufacturing, highlighting its benefits in precision, speed and cost reduction in construction. In turn, through the implementation of success stories, it will show how robotics and digital fabrication are being integrated into modern architectural projects with the aim of achieving unprecedented levels of innovation and efficiency.

In this way, this TECH program will provide the flexibility of a 100% online format for the benefit of the students, who will only need an electronic device with an Internet connection to access all the didactic materials. In addition, the revolutionary Relearning methodology, characterized by the repetition of key ideas for effective learning, will be used.

This **Postgraduate Certificate in Parametric Design and Digital Manufacturing** 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 Engineering focused on Artificial the use of Intelligence
- The graphic, schematic and eminently practical contents with which it is conceived gather scientific and practical information on those disciplines that are indispensable 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

You will enter a booming sector with great projection, highlighting your mastery of a wide variety of applications, such as Generative Design, for algorithmic optimization in architecture"

Through the Relearning methodology you will assimilate all the knowledge in a progressive way, equipping you with unparalleled skills in the area of Parametric Design applying Artificial Intelligence"

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.

Complement your professional career by deepening your knowledge in the use of the best Digital Manufacturing tools, which favor cost reduction, thanks to an extensive library of innovative multimedia resources.

You will be immersed in sustainability for Parametric Design with the famous Topology Optimization method, through the best didactic materials, at the forefront of technology and academia.

02

Objectives

This academic program has been designed to provide engineers with a comprehensive approach ranging from the most advanced theoretical and practical knowledge, such as digital manufacturing and construction robotics, to the use of innovative tools such as Autodesk Fusion 360 for spatial adaptability. Therefore, thanks to the rigorous curriculum, any professional will be able to achieve their most ambitious goals through this program focused on their needs, presented in an accessible and flexible format. This will ensure that students develop specialized skills in a short period of time, optimizing their academic growth.

Strengthen your skills in the use of simulations and data lifecycle analysis, integrating Artificial Intelligence to optimize sustainable decision making within the context of Parametric Design"

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 AI 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

Specific Objectives

- 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

Reach your professional goals thanks to the skills that this Postgraduate Certificate will give you, training you in the implementation of robotics technologies, such as KUKA PRC, in the field of Digital Manufacturing"

03

Course Management

TECH has meticulously selected its teaching team to guarantee a first class preparation to its graduates. This group of experts not only has an outstanding track record in the field, but also enjoys great recognition in academia Thanks to their experience, they will offer a global and updated vision of the sector, providing the most advanced tools to face current and future engineering challenges. In addition, they will impart knowledge on the use of Grasshopper, equipping students with the best skills to excel in their professional careers.

The Postgraduate Certificate teachers are experts in Parametric Design and Digital Manufacturing through AI, putting their years of experience at your disposal for your successful professional career in engineering"

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

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

04

Structure and Content

This Postgraduate Certificate has been designed by a team of experts in the field of Engineering, with a special focus on Parametric Design and Digital Manufacturing. Therefore, TECH has implemented an intensive program that will provide professionals with everything they need to master this discipline. In addition, a selection of additional materials will be included, which will allow to customize the learning according to the engineer's level of demand. In fact, these tools are complemented by the implementation of advanced methodologies for innovation and efficiency in collaborative design projects.

You will enjoy a comprehensive academic itinerary, which will guarantee the mastery of topological optimization techniques to improve sustainability in Parametric Design. With all the TECH quality guarantees!"

Module 1. Parametric Design and Digital Manufacturing

1.1. Advances in Parametric Design and Digital Fabrication with Grasshopper
- 1.1.1. Using Grasshopper to Create Complex Parametric Designs
- 1.1.2. Integrating AI into Grasshopper to Automate and Optimize Design
- 1.1.3. Flagship Projects Using Parametric Design for Innovative Solutions

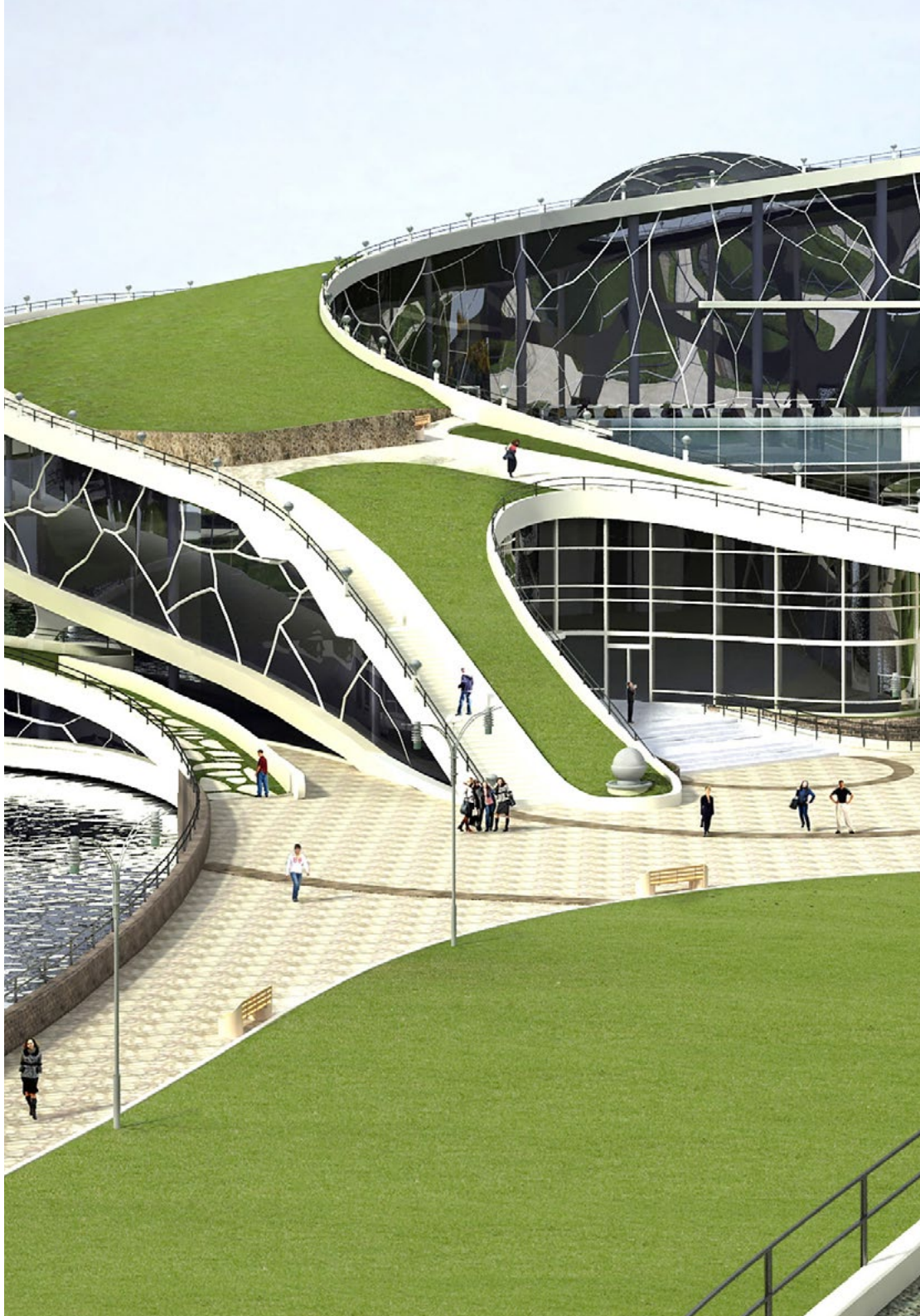
1.2. Algorithmic Optimization in Design with Generative Design
- 1.2.1. Application of Generative Design for Algorithmic Optimization in Architecture
- 1.2.2. Using AI to Generate Efficient and Novel Design Solutions
- 1.2.3. Examples of How Generative Design Has Improved the Functionality and Aesthetics of Architectural Projects

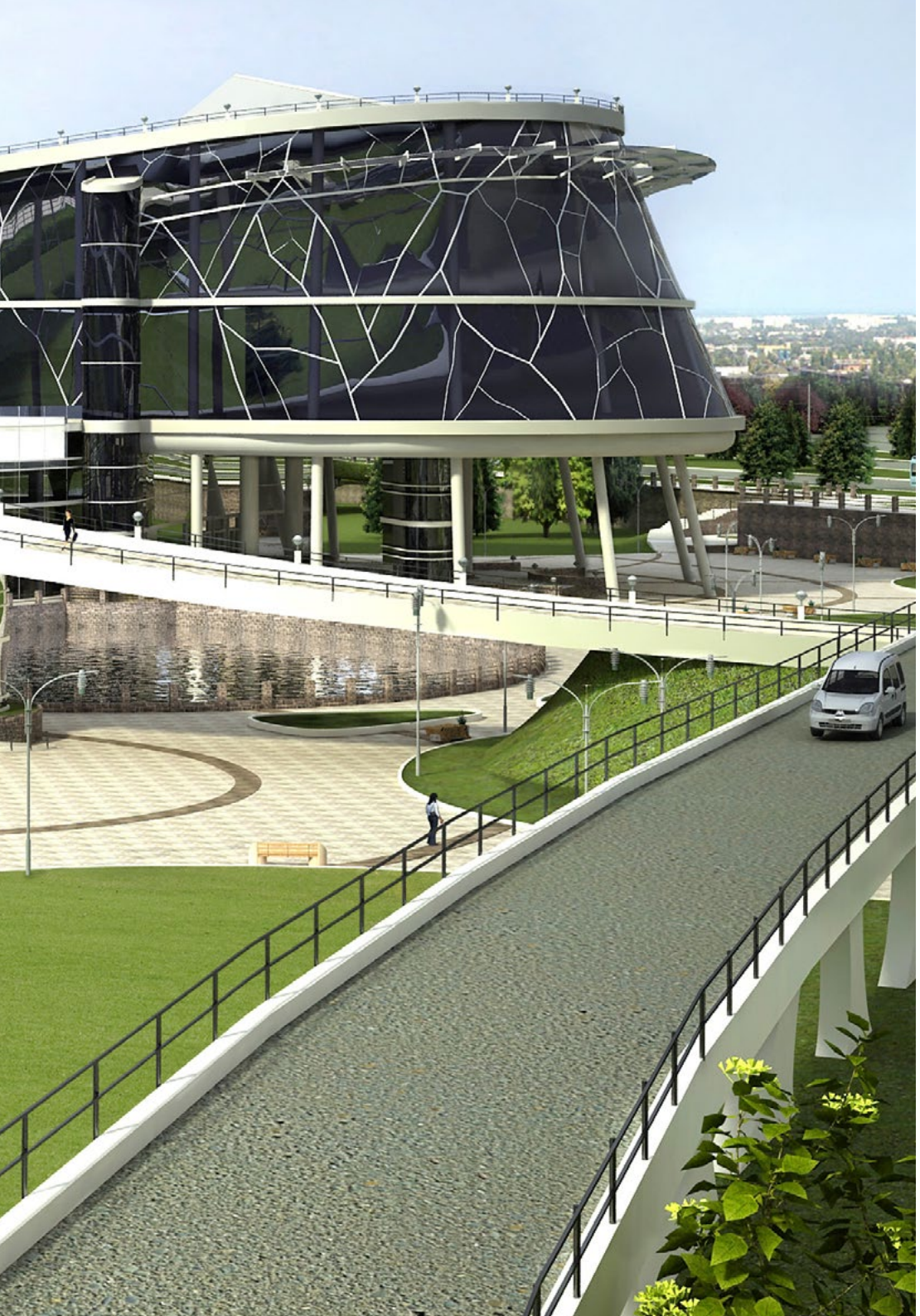
1.3. Digital Fabrication and Robotics in Construction with KUKA PRC
- 1.3.1. Implementing Robotics Technologies such as KUKA PRC in Digital Fabrication
- 1.3.2. Advantages of Digital Manufacturing in Precision, Speed and Cost Reduction
- 1.3.3. Digital Manufacturing Case Studies Highlighting Successful Integration of Robotics in Architecture

1.4. Adaptive Design and Manufacturing with Autodesk Fusion 360
- 1.4.1. Using Fusion 360 to Design Adaptive Architectural Systems
- 1.4.2. Implementing AI in Fusion 360 for Mass Customization
- 1.4.3. Innovative Projects Demonstrating the Potential for Adaptability and Customization

1.5. Sustainability in Parametric Design with Topology Optimization
- 1.5.1. Applying Topology Optimization Techniques to Improve Sustainability
- 1.5.2. Integrating AI to Optimize Material Usage and Energy Efficiency
- 1.5.3. Examples of How Topological Optimization Has Improved the Sustainability of Architectural Projects

1.6. Interactivity and Spatial Adaptability with Autodesk Fusion 360
- 1.6.1. Integrating Real-Time Data and Sensors to Create Interactive Architectural Environments
- 1.6.2. Using Autodesk Fusion 360 in Adapting Design in Response to Environmental or Usage Changes
- 1.6.3. Examples of Architectural Projects Using Spatial Interactivity to Improve User Experience





1.7. Efficiency in Parametric Design
- 1.7.1. Applying Parametric Design to Optimize Sustainability and Energy Efficiency of Buildings
- 1.7.2. Using Simulations and Life Cycle Analysis Integrated with AI to Improve Green Decision-Making
- 1.7.3. Cases of Sustainable Projects Where Parametric Design Has Been Crucial

1.8. Mass Customization and Digital Manufacturing with Magic (Materialise)
- 1.8.1. Exploring the Potential of Mass Customization through Parametric Design and Digital Manufacturing
- 1.8.2. Applying Tools such as Magic to Customize Architectural and Interior Design
- 1.8.3. Outstanding Projects Showcasing Digital Manufacturing in the Customization of Spaces and Furniture

1.9. Collaboration and Collective Design Using Ansys Granta
- 1.9.1. Using Ansys Granta to Facilitate Collaboration and Decision Making in Distributed Design
- 1.9.2. Methodologies to Improve Innovation and Efficiency in Collaborative Design Projects
- 1.9.3. Examples of How AI-Enhanced Collaboration Can Lead to Innovative and Sustainable Results

1.10. Challenges and the Future of Digital Manufacturing and Parametric Design
- 1.10.1. Identifying Emerging Challenges in Parametric Design and Digital Manufacturing
- 1.10.2. Future Trends and the Role of AI in the Evolution of These Technologies
- 1.10.3. Discussion of How Continuous Innovation Will Affect Architectural Practice and Design in the Future

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.

contains the most complete and up-to-date program on the market. The most important features include:

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

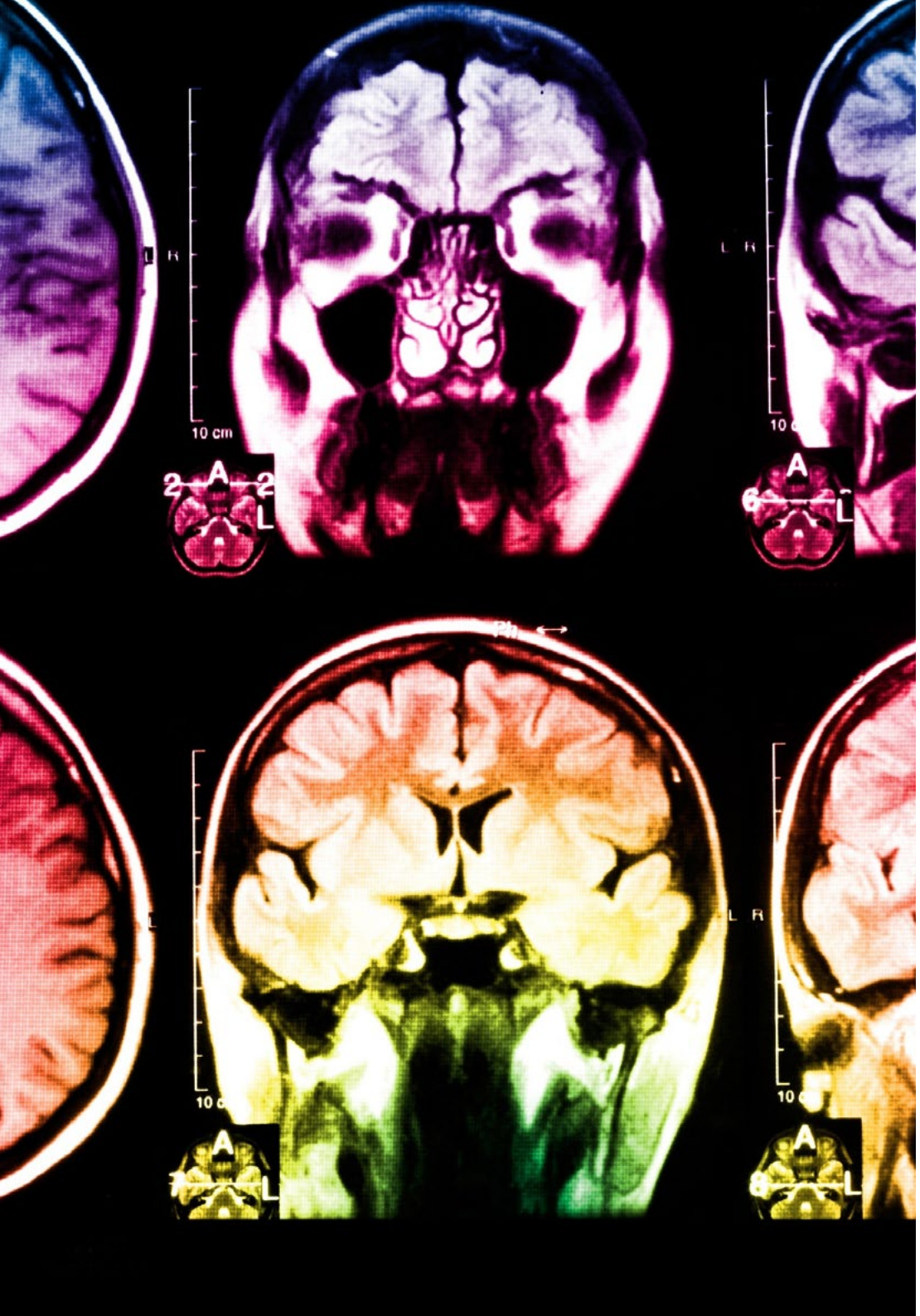
TECH effectively combines the Case Study methodology with a 100% online learning system based on repetition, which combines 8 different teaching elements in each lesson.

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.

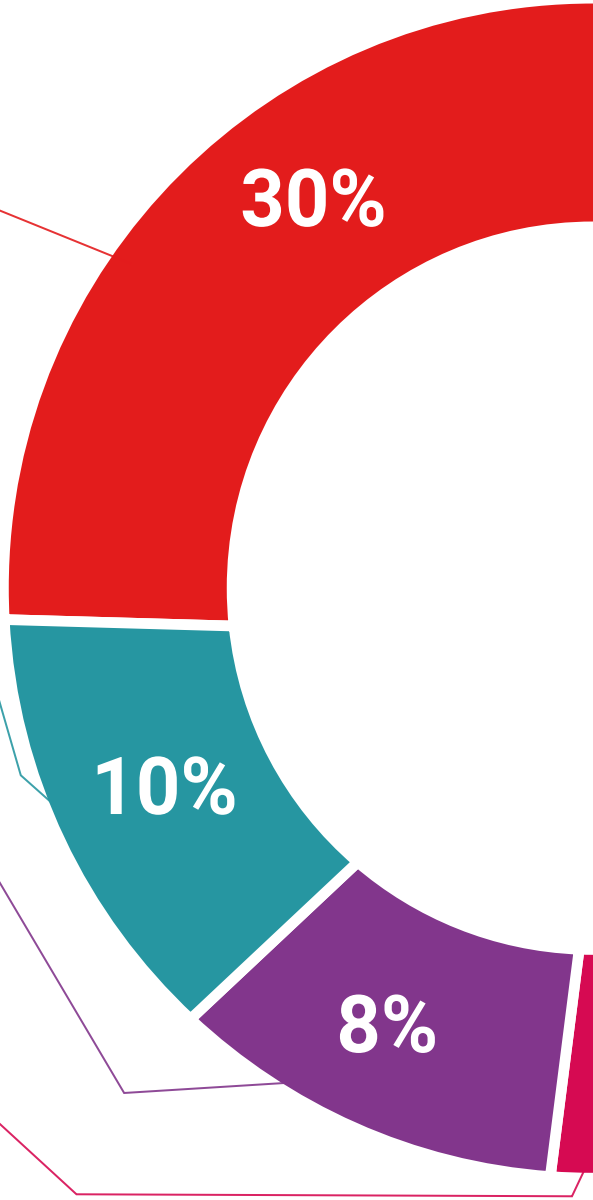
Learning from an Expert strengthens knowledge and memory, and generates confidence in future difficult decisions.

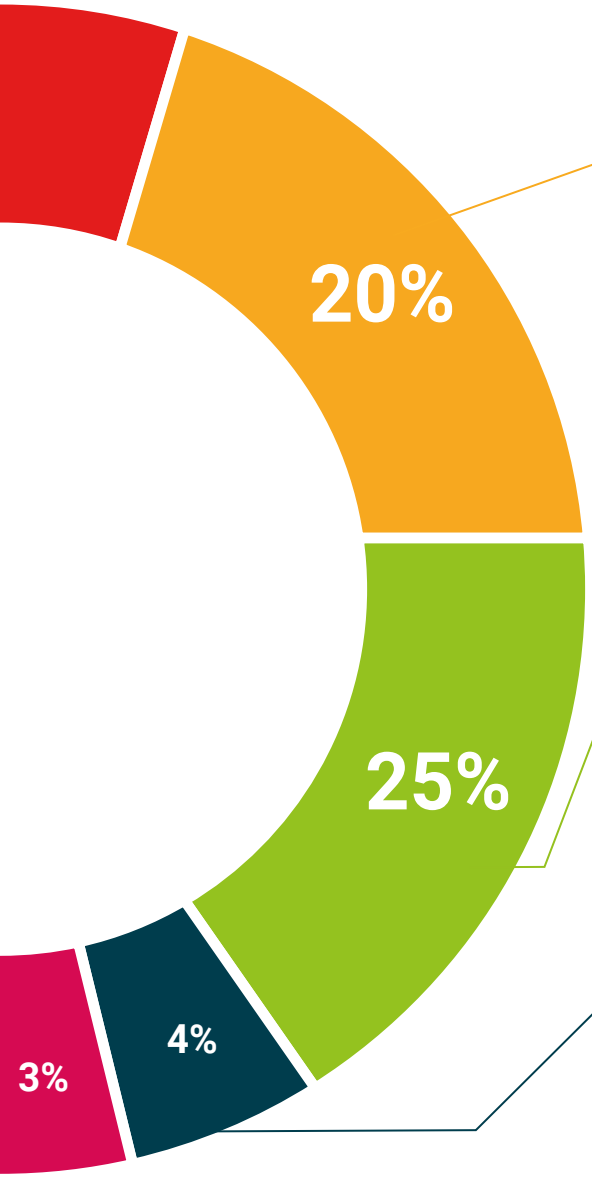
Practising Skills and Abilities

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 Parametric Design and Digital Manufacturing guarantees students, in addition to the most rigorous and up-to-date education, access to a Postgraduate Certificate 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 a **Postgraduate Certificate in Parametric Design and Digital Manufacturing** endorsed by TECH Global University, the largest digital university in the world.

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 Certificate in Parametric Design and Digital Manufacturing**

Modality: **online**

Duration: **6 weeks**

Accreditation: **6 ECTS**


tech global university

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

Postgraduate Certificate in Parametric Design and Digital Manufacturing

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

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