Postgraduate Certificate
Hybrid Systems and Energy Storage

tech global university

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Postgraduate Certificate
Hybrid Systems and Energy Storage

- Modality: **online**
- Duration: **2 months**
- Certificate: **TECH Global University**
- Credits: **6 ECTS**
- Schedule: **at your own pace**
- Exams: **online**

Website: **www.techtitute.com/us/engineering/postgraduate-certificate/hybrid-systems-energy-storage**

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01

Introduction

Renewable Energies are undoubtedly on the rise and this market increasingly requires specialized professionals who know how to manage them and choose those that are best in each case. Aware of this, TECH professionals have designed this comprehensive program that aims to provide engineers with knowledge and trends in the latest technologies available in the field of systems capable of storing electrical energy, which are considered essential in the energy transition to a sustainable model, especially in those societies based on solar and wind power generation, renewable sources with variable resources. All this in order to provide professionals with a global vision on the subject, which will help them to work in this field with greater guarantees of success.

Systems with the capacity to store electrical energy are considered essential in the energy transition to a sustainable model. Learn all about them with this TECH Postgraduate Certificate"

The renewable energy sector is in full international expansion and is increasingly demanding engineers specialized in this field. Therefore, the best professionals in the sector have designed this complete Postgraduate Certificate that aims to help professionals with high knowledge in everything that encompasses the renewable energy sector to increase their working position in today's energy market.

Specifically, this Postgraduate Certificate will discuss systems with the capacity to store electrical energy, which are considered essential in the energy transition towards a sustainable model, especially in those models based on solar and wind energy generation, renewable sources with variable resources.

The interest in its application in the energy sector has increased significantly in recent years due to the strong cost reduction favored by the high demand in other sectors such as Consumer Electronics or Electric Mobility, with which it also tends to converge in many points.

Although the first technologies emerged almost simultaneously with the electrical industry itself in the 19th century, for many years their application was (for the most part) limited to supporting and powering small systems with limited autonomy.

However, in recent decades a wide variety of new forms of storage have emerged. They offer differentiated characteristics that make them suitable for multiple applications. The European Patent Office (EPO) recently highlighted that in the last ten years the annual increase rate of patent applications related to storage technologies is four times higher than that of other technologies.

For all these reasons, the program will focus on lithium-ion based battery systems, which are set to dominate the industry in the next ten years, and which have a series of particularities that make it particularly interesting to know the most relevant functional details to be able to integrate them in different scenarios in energy generation and management.

This **Postgraduate Certificate in Hybrid Systems and Energy Storage** contains the most complete and up-to-date educational program on the market. The most important features include:

- The development of case studies presented by experts in Renewable Energies
- The graphic, schematic, and practical contents with which they are created, provide scientific and 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

Want to explore the area of Innovation and Renewable Energy? You will have the opportunity to access an exclusive Masterclass, designed by a renowned international expert in this field"

Get to know the global operation of Hybrid Systems and add new skills to your professional profile with this program"

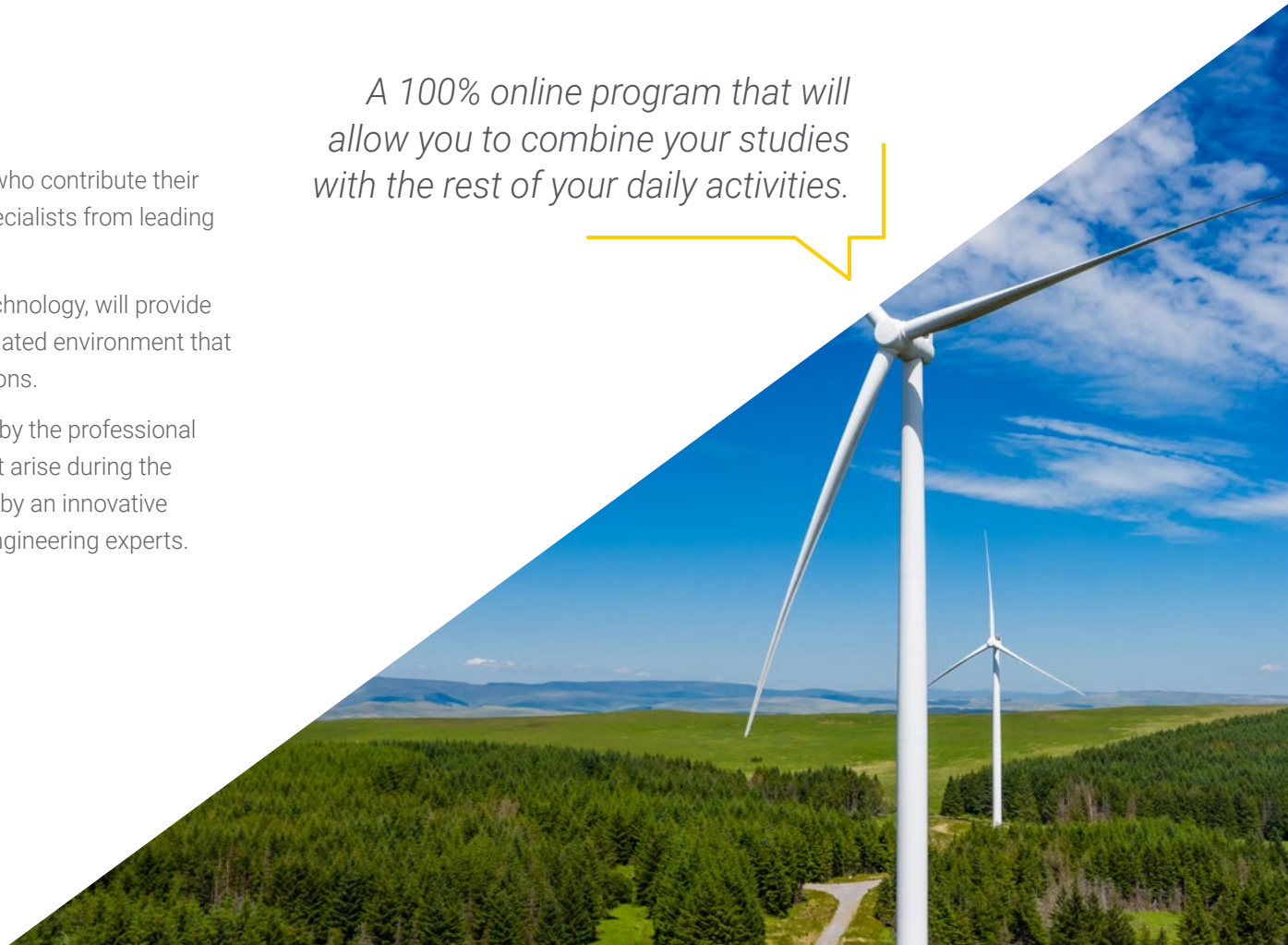
You will have innovative didactic materials and resources that will facilitate the learning process and the retention of the contents learned for a longer period of time.

A 100% online program that will allow you to combine your studies with the rest of your daily activities.

The program's teaching staff includes professionals from sector who contribute their work experience to this training 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 training programmed to train in real situations.

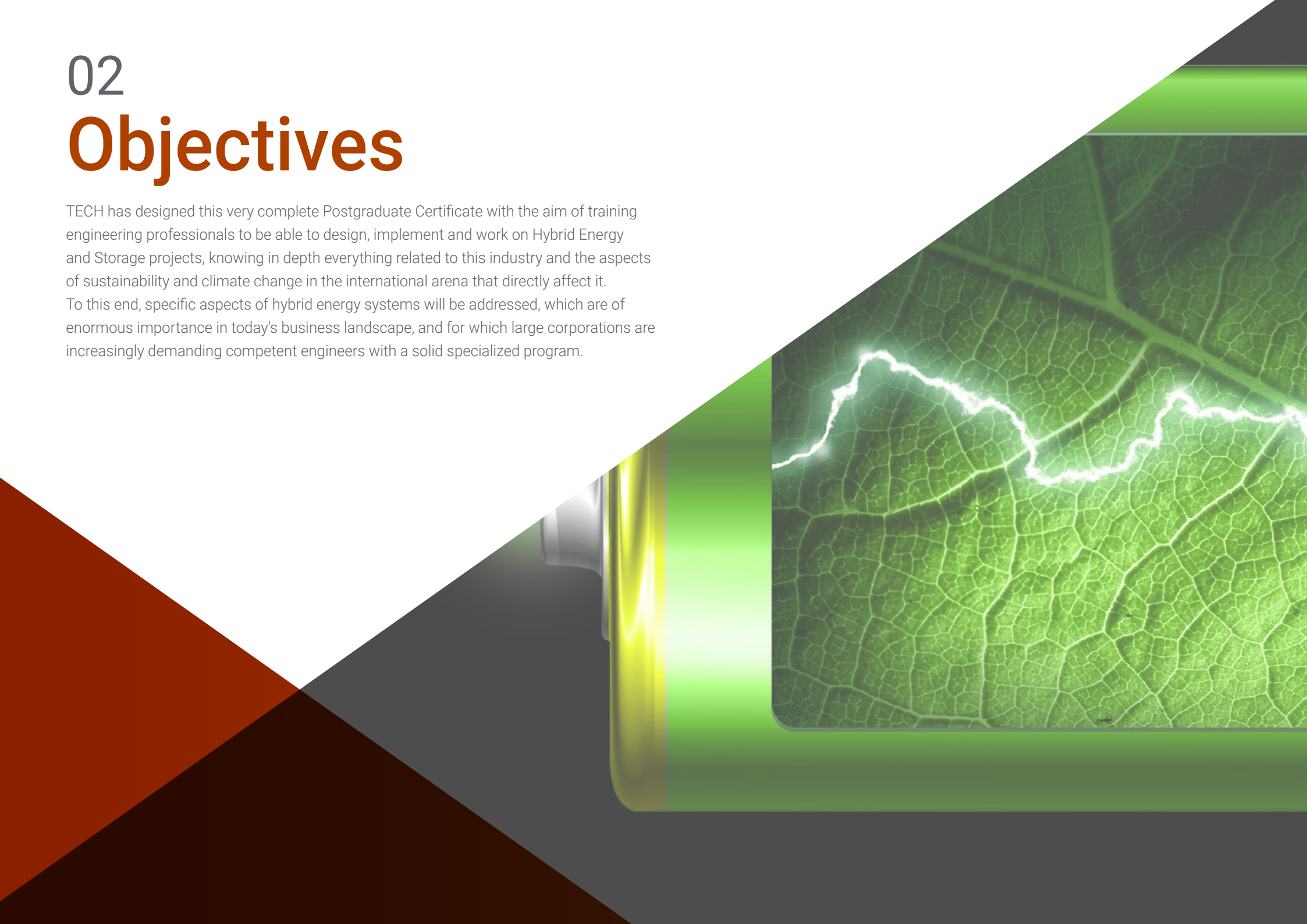
This program is designed around Problem-Based Learning, whereby the professional must try to solve the different professional practice situations that arise during the academic year. For this purpose, the professional will be assisted by an innovative interactive video system created by renowned and experienced engineering experts.



02

Objectives

TECH has designed this very complete Postgraduate Certificate with the aim of training engineering professionals to be able to design, implement and work on Hybrid Energy and Storage projects, knowing in depth everything related to this industry and the aspects of sustainability and climate change in the international arena that directly affect it.
To this end, specific aspects of hybrid energy systems will be addressed, which are of enormous importance in today's business landscape, and for which large corporations are increasingly demanding competent engineers with a solid specialized program.



With this program, TECH has only one goal: to help you grow in your profession and become a prestigious engineer"

General Objectives

- Conduct an exhaustive analysis of current legislation and the energy system, from electricity generation to the consumption phase, as well as the fundamental production factor in the economic system and the functioning of the different energy markets
- Identify the different phases required for the feasibility and implementation of a Renewable Energy project and its commissioning
- Analyze in depth the different technologies and manufacturers available to create systems for the exploitation of hydraulic energies, distinguish and critically select those qualities according to the costs and their actual application
- Identify the operation and maintenance tasks required for the correct operation of Renewable Energy installations
- Size facilities for the application of all energy sources of lesser implementation such as mini-hydro, geothermal, tidal and clean vectors
- Manage and analyze relevant bibliography on a topic related to one or some of the fields of Renewable Energies, published both nationally and internationally
- Adequately interpret society's expectations on the environment and climate change, and engage in technical discussions and critical opinions on energy aspects of sustainable development, as skills that Renewable Energy professionals should have
- Integrate knowledge and face the complexity of formulating reasoned judgments in the field applicable to a company in the Renewable Energy sector
- Master the different existing solutions or methodologies for the same problem or phenomenon related to Renewable Energies and develop a critical spirit knowing the practical limitations

Specific Objectives

- Analyze the importance of electrical energy storage systems in the current energy sector landscape, showing the impact it has on the planning of generation, distribution and consumption models
- Identify the main technologies available in the market, explaining their characteristics and applications
- Have a transversal vision with other sectors in which the deployment of electric storage systems will have an impact on the configuration of new energy models, with special emphasis on the automotive and electric mobility sectors
- Have an overview of the usual steps followed in the development of projects with storage systems, especially focused on batteries
- Identify the main concepts for the integration of storage systems in power generation systems, especially with photovoltaic and wind systems

A training designed based on practical cases that will teach you how to act in real situations in the daily practice of your profession"

03

Course Management

TECH applies a criterion based on high quality in all its training This guarantees students that by studying here they will find the best didactic content taught by the best professionals in the sector In this sense, this Postgraduate Certificate in Hybrid Systems and Energy Storage has highly prestigious professionals within this area, who pour into the program the experience of their years of work, as well as the knowledge acquired from research in the field. All to provide the engineer with a high-level program, which will enable them to practice in national and international environments with greater guarantees of success.

Learn with the best and acquire the knowledge and skills you need to intervene in this area of development with total success"

International Guest Director

Varun Sivaram, Ph.D. is a **physicist, bestselling author** and leading **clean energy technology** expert with a career spanning the corporate, public and academic sectors. In fact, he has served as **Director of Strategy and Innovation at Orsted**, one of the world's leading renewable energy companies with the largest offshore wind power portfolio.

In addition, Dr. Sivaram has served in the U.S. Biden-Harris administration, as Director General for Clean Energy and Innovation, as well as Senior Advisor to Secretary John Kerry, the Special Presidential Climate Envoy to the White House. In this capacity, he was the creator of the First Movers Coalition, a key initiative to foster clean energy innovation globally.

In the academic field, he has directed the Energy and Climate Program at the Council on Foreign Relations. And his influence in the formulation of government policies to support innovation has been remarkable, having advised leaders such as the mayor of Los Angeles and the governor of New York. He has also been recognized as a Young Global Leader by the World Economic Forum.

In addition, Dr. Varun Sivaram has published several influential books, including "Taming the Sun: Innovations to Harness Solar Energy and Power the Planet" and "Energizing America: A Roadmap to Launch a National Energy Innovation Mission", both of which have received accolades from prominent leaders such as Bill Gates. In fact, his contribution to the clean energy field has been recognized internationally, being included in the TIME 100 Next list and incorporated by Forbes in its Forbes 30 Under 30 list in Law and Policy, among other major accolades.

Dr. Sivaram, Varun

- Director of Strategy and Innovation at Ørsted, United States
- Managing Director, Clean Energy and Innovation // Senior Advisor to Secretary John Kerry, U.S. Special Presidential Climate Envoy at The White House
- Chief Technology Officer at ReNew Power
- Strategic Advisor for Energy and Finance on Reforming the Energy Vision at the New York Governor's Office
- Ph.D. in Condensed Matter Physics from Oxford University
- B.S. in Engineering Physics and International Relations from Stanford University.
- Awards: Forbes 30 Under 30, awarded by Forbes magazine
  Grist Top 50 Leaders in Sustainability, awarded by Grist magazine
  MIT TR Top 35 Innovators, awarded by MIT Tech Review Magazine
  TIME 100 Next Most Influential People in the World, awarded by TIME Magazine
- Young Global Leader, awarded by the World Economic Forum
- Member of: Atlantic Council ,Breakthrough Institute , Aventurine Partners

Thanks to TECH, you will be able to learn with the best professionals in the world"

Guest Director

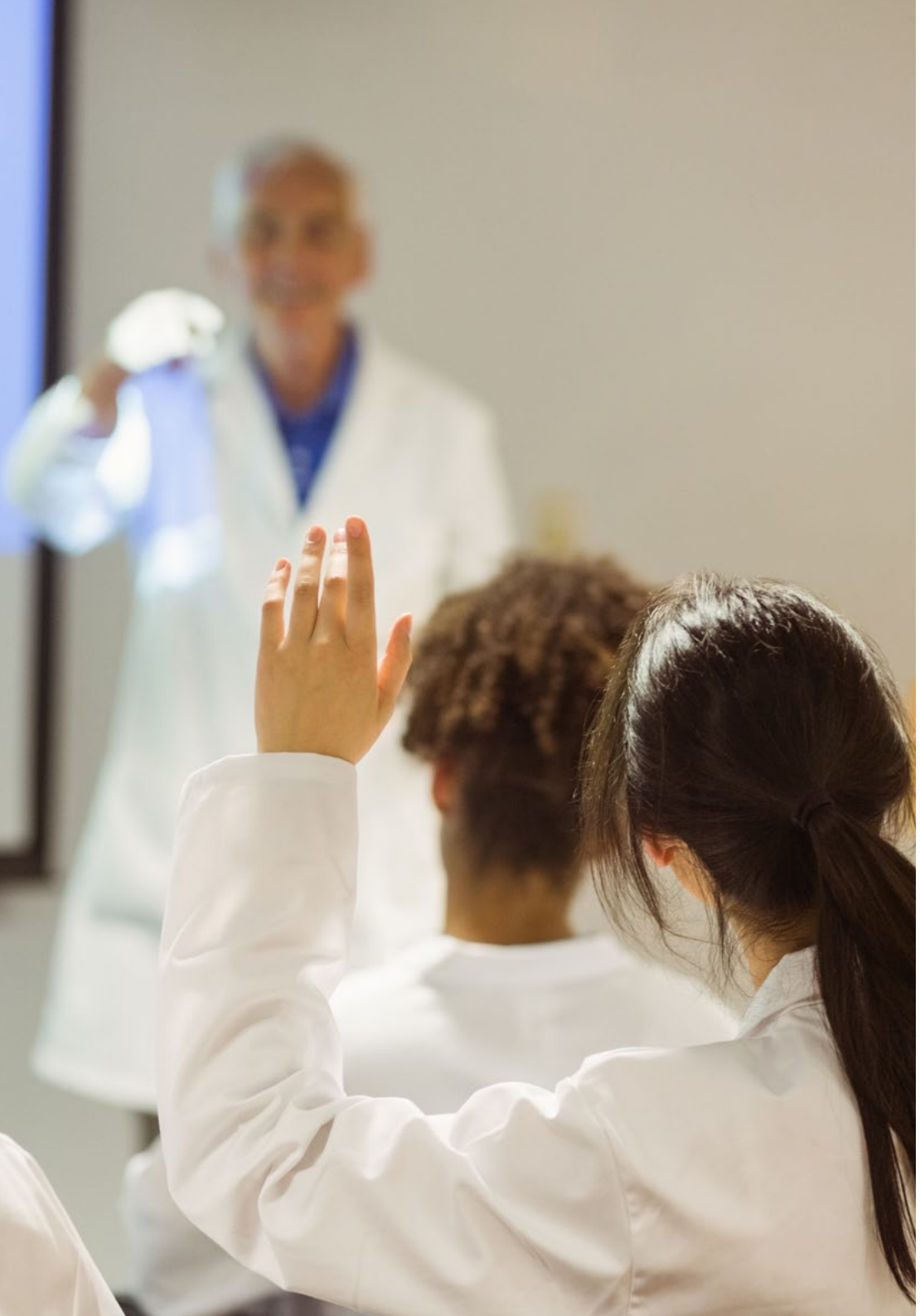
Mr. De la Cruz Torres, José

- Degree in Physics and Industrial Electronics Engineering, University of Seville
- Master's Degree in Operations Management by EADA Business School Barcelona
- Master's Degree in Industrial Maintenance Engineering, University of Huelva, Spain
- Railway Engineering, UNED
- South head of the appraisal, assessment and valuation of technologies and processes of Renewable Energy generation facilities at RTS International Loss Adjusters

Co-Direction

Lillo Moreno, Javier

- Telecommunications Engineer, University of Seville
- Master's Degree in Project Management and Master's Degree in Big Data & Business Analytics, School of Industrial Organization (EOI)
- With an extensive professional career in the Renewable Energy sector of more than 15 years
- Has managed the O&M areas of several companies with high visibility in the sector



Professors

Montoto Rojo, Antonio

- Electronics Engineer from the University of Seville
- MBA Master's Degree Camilo José Cela University
- Account Manager for storage systems at Gamesa Electric

A unique, key, and decisive training experience to boost your professional development"

04

Structure and Content

The syllabus of the Postgraduate Certificate is configured as a complete tour through each and every one of the skills necessary to understand and assume the ways of working in this field. Thus, through a novel didactic approach, based on the practical application of the contents, the engineer will learn and understand the operation of Hybrid Energy and Storage, knowing how to design and implement projects in this sense, providing high levels of safety and services to companies. This, in addition to adding value to your professional profile, will make you a much better prepared professional to work in a variety of environments.

A comprehensive syllabus focused on acquiring knowledge and converting it into real skills, created to propel you to excellence"

Module 1. Hybrid Systems and Energy Storage

1.1. Electric Storage Technologies
- 1.1.1. The Importance of Energy Storage in the Energy Transition
- 1.1.2. Energy Storage Methods
- 1.1.3. Main Storage Technologies

1.2. Industrial View of Electric Storage
- 1.2.1. Automotive and Mobility
- 1.2.2. Stationary Applications
- 1.2.3. Other Applications

1.3. Elements of a Battery Energy Storage System (BESS)
- 1.3.1. Batteries
- 1.3.2. Adaptation
- 1.3.3. Control

1.4. Integration and Applications of BESS in Electrical Grids
- 1.4.1. Integration of Storage Systems
- 1.4.2. Applications in Grid-Connected Systems
- 1.4.3. Applications in Off-Grid and Microgrid Systems

1.5. Business Models I
- 1.5.1. Stakeholders and Business Structures
- 1.5.2. Feasibility of Projects with BESS
- 1.5.3. Risk Management

1.6. Business Models II
- 1.6.1. Project Construction
- 1.6.2. Performance Evaluation Criteria
- 1.6.3. Operation and Maintenance

1.7. Lithium-Ion Batteries
- 1.7.1. Evolution of Batteries
- 1.7.2. Main Elements
- 1.7.3. Technical and Safety Considerations

1.8. Hybrid PV Systems with Storage
- 1.8.1. Design Considerations
- 1.8.2. PV + BESS Services
- 1.8.3. Studied Types

1.9. Hybrid Wind Systems With Storage
- 1.9.1. Design Considerations
- 1.9.2. Wind + BESS Services
- 1.9.3. Studied Types

1.10. Future of Storage Systems
- 1.10.1. Technological Trends
- 1.10.2. Economic Outlook
- 1.10.3. Storage Systems in BESS

A unique learning opportunity that will catapult your career to the next level Don't let it slip away"

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

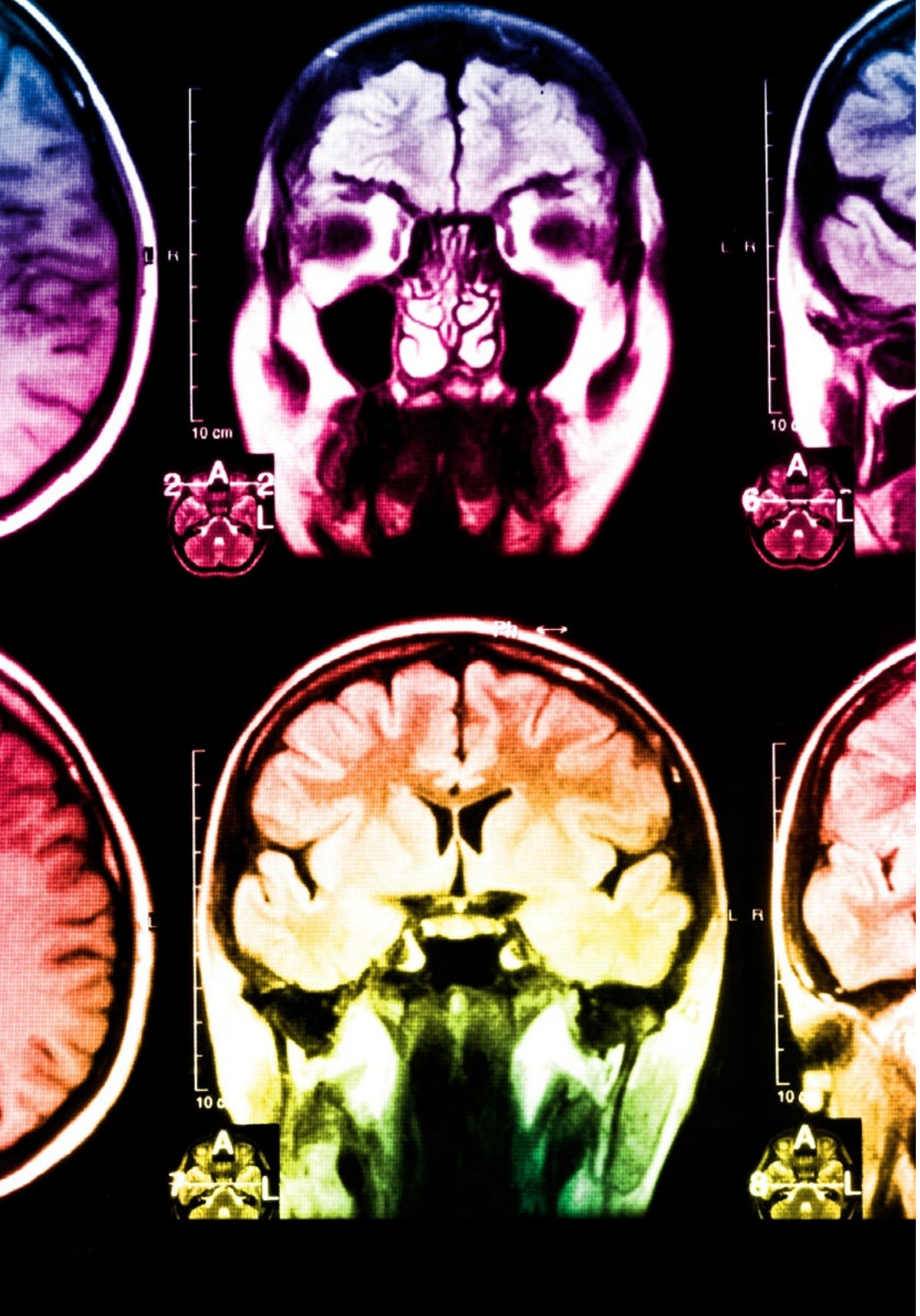
TECH effectively combines the Case Study methodology with a 100% online learning system based on repetition, which combines 8 different teaching elements in each lesson.

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.

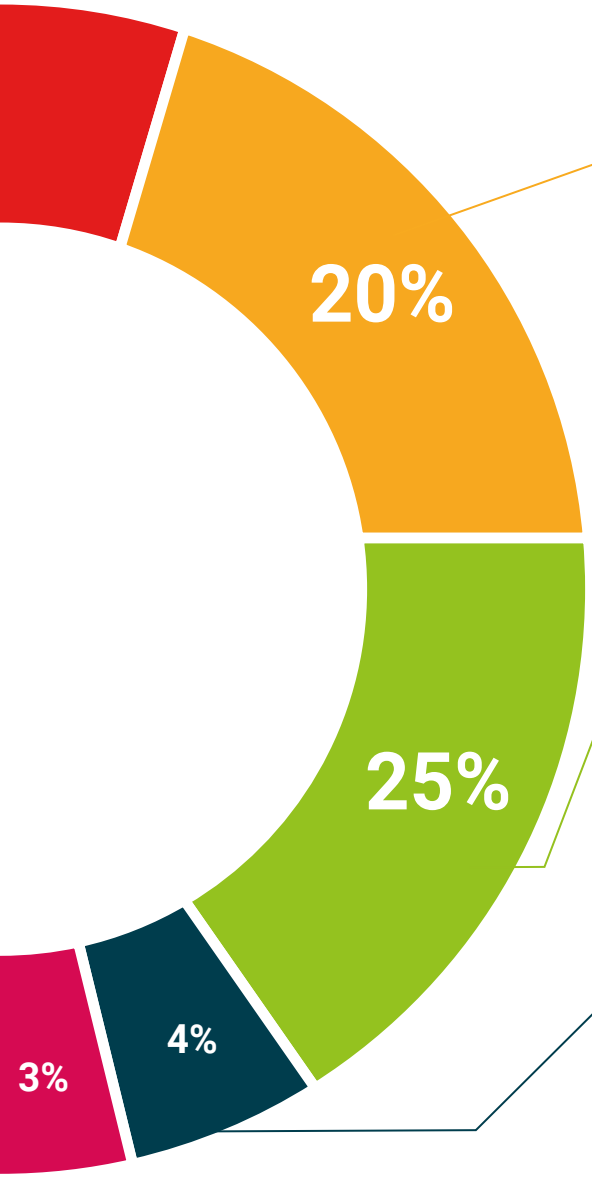
Learning from an Expert strengthens knowledge and memory, and generates confidence in future difficult decisions.

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 Hybrid Systems and Energy Storage 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 your **Postgraduate Certificate in Hybrid Systems and Energy Storage** 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 2002. 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.

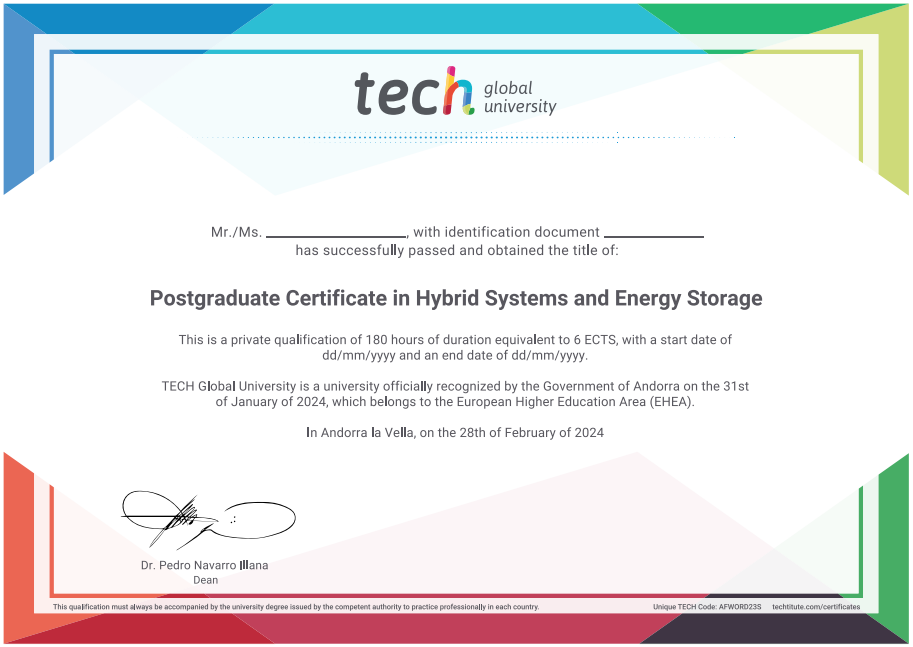
This **TECH Global University** title is a European program of continuing education and professional updating that guarantees the acquisition of competencies in its area of knowledge, providing a high curricular value to the student who completes the program.

Title: **Postgraduate Certificate in Hybrid Systems and Energy Storage**

Modality: **online**

Duration: **2 months**

Accreditation: **6 ECTS**


tech global university

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

Postgraduate Certificate in Hybrid Systems and Energy Storage

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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