

Postgraduate Certificate

Hydrogen Energy Applications





Postgraduate Certificate Hydrogen Energy Applications

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

Website: www.techtute.com/us/engineering/postgraduate-certificate/hydrogen-energy-applications

Index

01

Introduction

p. 4

02

Objectives

p. 8

03

Course Management

p. 12

04

Structure and Content

p. 16

05

Methodology

p. 24

06

Certificate

p. 28

01

Introduction

Green hydrogen has multiple possibilities and is being exploited by industry, the mobility sector or the steel industry to considerably reduce atmospheric pollution. However, its final use will depend not only on the type of sector that employs it, but also on the existing and still developing technical possibilities. Given the relevance of this energy vector for the present and future sustainability of the planet, companies are looking for professionals specialized in this field. This is the reason why TECH offers this 100% online program, which provides the most advanced knowledge about the different uses of hydrogen and its potential depending on the productive sector in which it is used. All this will be possible thanks to a theoretical-practical quality content developed by a specialized teaching team with extensive experience in one of the sectors of greatest future growth.





H₂

“

This 100% online Postgraduate Certificate will make you improve your career as a specialist in Hydrogen and its application in different sectors"

Currently, large companies such as Repsol, Enagás or BMW are betting on projects in their sectors to reduce pollution through more environmentally friendly energy alternatives. Among them is hydrogen, which is currently postulated as one of the cheapest and most efficient options with lower CO2 emissions.

Therefore, its use is much more widespread in industry, which is working on perfecting processes to make it truly ecological, while other sectors such as mobility are focusing their efforts on the implementation and improvement of the fuel cell and the production of e-fuels. However, the many existing options still require a major push from private companies and public entities. Given this reality, the engineering professional has before him a perfect opportunity to prosper in an expanding sector with a broad future. That is why TECH has designed this Postgraduate Certificate in Hydrogen Energy Applications, which comes to give the boost that the professional career of engineers needs.

A program with a theoretical-practical approach, where students will delve into the different end uses of hydrogen and its potential. For this purpose, multimedia resources will allow you to learn about e-fuel, the Haber-Bosch process and its environmental impact, as well as the use of hydrogen in refineries, steel mills, the chemical, semiconductor and glass industries in an attractive way.

Likewise, this university education will lead you to acquire a solid knowledge about blending, the methodology used in the injection of hydrogen into the Natural Gas network, its current capacities and the existing problems. This will be possible thanks to the *Relearning* system, which allows students to reduce the long hours of study.

A Postgraduate Certificate taught exclusively online, which can be easily accessed at any time of the day, from an electronic device with an Internet connection. With no classroom attendance or fixed class schedules, this program is an ideal academic option for those who wish to combine their professional and/or work responsibilities with a high-level education.

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

- ◆ Case studies presented by engineering experts
- ◆ The graphic, schematic and practical contents of the book provide technical and practical information on those disciplines that are essential for professional practice
- ◆ Practical exercises where the self-assessment process can be carried out to improve learning
- ◆ Its special emphasis on innovative methodologies
- ◆ Theoretical lessons, questions to the expert, debate forums on controversial topics, and individual reflection assignments
- ◆ Content that is accessible from any fixed or portable device with an Internet connection



A university program in line with the current academic times and with the most advanced knowledge in the uses of hydrogen in the short and long term"

“

An academic option that will allow you to work through case studies on the different methods and techniques used in the application of hydrogen in energy sectors”

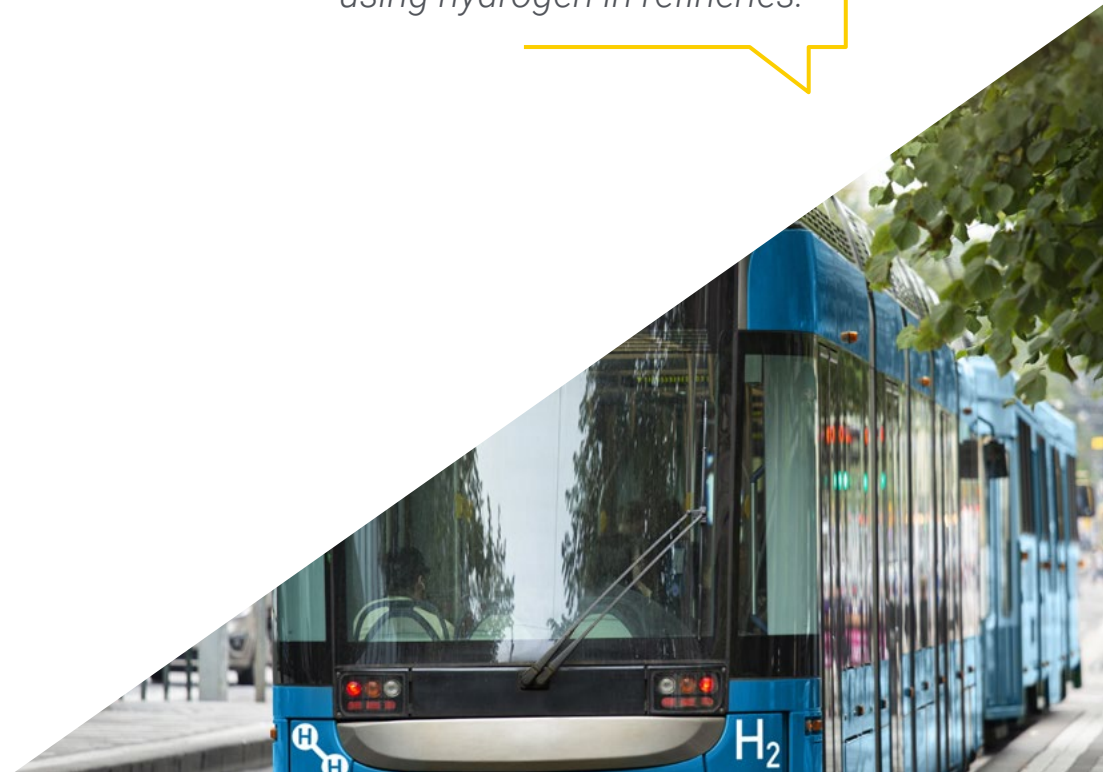
The program's teaching staff includes professionals from the industry who contribute their work experience to this program, as well as renowned specialists from leading societies and prestigious universities.

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. This will be done with the help of an innovative system of interactive videos made by renowned experts.

Enroll now in a program that offers you a library of multimedia resources, 24 hours a day, 7 days a week.

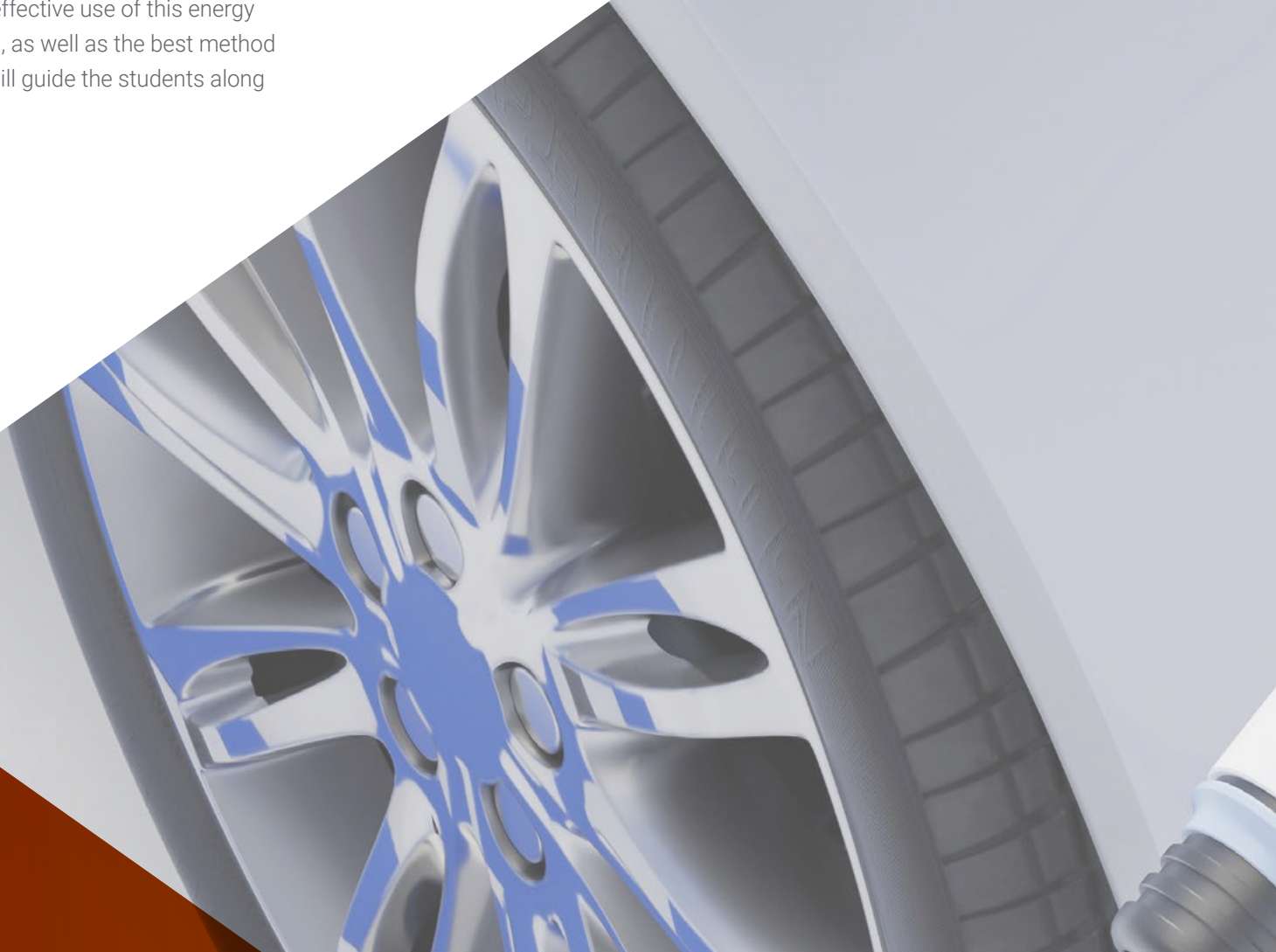
You can delve deeper into the environmental impact and cost of using hydrogen in refineries.



02

Objectives

The main objective of this Postgraduate Certificate is to provide the necessary pedagogical tools for students to obtain an advanced and accurate learning about Hydrogen Energy Applications. In this way, at the end of this course, the graduate will have broadened their competences to determine the most effective use of this energy according to the sector, the techniques and equipment used, as well as the best method to substitute hydrogen for natural gas. The teaching team will guide the students along this path, so that they can successfully achieve these goals





“

Thanks to this program you will be able to successfully establish the integration of hydrogen in different markets"



General Objectives

- ◆ Generate specialized knowledge of hydrogen, focusing on its end uses
- ◆ Analyze the potential of green hydrogen in its end uses
- ◆ Establish ways of integrating hydrogen into the marketplace

“

Examine the Haber-Bosch process and methanol production in depth”





Specific Objectives

- ◆ Train students in e-Fuels production processes
- ◆ Specialize students in hydrogen integration in fuel cell vehicles
- ◆ Analyze the idiosyncrasies of the hydrogen-industry relationship
- ◆ Examine the Haber-Bosch process and methanol production in depth
- ◆ Determine the relationship between hydrogen and its use in refineries and its use in steel mills
- ◆ Raise students' awareness of the need for natural gas substitution
- ◆ Develop the techniques of co-generation and electricity production with fuel cells and their importance

03

Course Management

This academic program includes the most specialized teaching staff in the current educational market. They are specialists selected by TECH to develop the whole syllabus. In this way, starting from their own existence and the latest evidence, they have designed the most up-to-date content that provides a guarantee of quality in such a relevant subject.



“

TECH offers the most specialized teaching staff in the field of study. Enroll now and enjoy the quality you deserve”

International Guest Director

With an extensive professional background in the energy sector, Adam Peter is a prestigious electrical engineer who stands out for his commitment to the use of clean technologies. Likewise, his strategic vision has driven innovative projects that have transformed the industry towards more efficient and environmentally friendly models.

In this way, he has worked in leading international companies such as Siemens Energy in Munich. In this way, he has held leadership roles ranging from Sales Management or Corporate Strategy Management to Market Development. Among his main achievements, he has led the Digital Transformation of organizations in order to improve their operational flows and maintain their competitiveness in the market in the long term. For example, he has implemented Artificial Intelligence to automate complex tasks such as predictive monitoring of industrial equipment or optimization of energy management systems.

In this regard, it has created multiple innovative strategies based on advanced data analysis to identify both patterns and trends in electricity consumption. As a result, companies have optimized their informed decision-making in real time and have been able to reduce their production costs significantly. In turn, this has contributed to companies' ability to adapt nimbly to market fluctuations and respond with immediacy to new operational needs, ensuring greater resilience in a dynamic working environment.

He has also led numerous projects focused on the adoption of renewable energy sources such as wind turbines, photovoltaic systems and cutting-edge energy storage solutions. These initiatives have enabled institutions to optimize their resources efficiently, guarantee a sustainable supply and comply with current environmental regulations. Undoubtedly, this has positioned the company as a reference in both innovation and corporate responsibility.



Mr. Peter, Adam

- ♦ Head of Hydrogen Business Development at Siemens Energy, Munich, Germany
- ♦ Sales Director at Siemens Industry, Munich
- ♦ President of Rotating Equipment for Upstream/Midstream Oil & Gas
- ♦ Market Development Specialist at Siemens Oil & Gas, Munich
- ♦ Electrical Engineer at Siemens AG, Berlin
- ♦ Degree in Electrical Engineering at the University of Applied Sciences Dieburg

“

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

04

Structure and Content

The different existing alternatives in the use of hydrogen have made the specialized teaching team, which teaches this program, compile in 150 teaching hours the most comprehensive and advanced knowledge in this field. Therefore, through multimedia pills, essential readings and case studies, students will learn how e-fuel compares to traditional fuels, the industrial uses of hydrogen and other sectors such as Chemical Engineering, Glass or Steel. Also, thanks to the *Relearningsystem*, based on the reiteration of content, the graduate will be able to advance in a much more natural way through the agenda of this Postgraduate Certificate.





“

A study plan that offers a theoretical and practical vision of the different uses and final applications of hydrogen”

Module 1. Hydrogen End-Uses

- 1.1. Industrial Uses of Hydrogen
 - 1.1.1. Hydrogen in Industries
 - 1.1.2. Origin of Hydrogen Used in Industry. Environmental Impact
 - 1.1.3. Industrial Uses in the Industry
- 1.2. Industries and Hydrogen e-Fuels Production
 - 1.2.1. e-Fuel Versus Traditional Fuels
 - 1.2.2. Classification of e-Fuels
 - 1.2.3. Current Status of e-Fuels
- 1.3. Ammonia Production: Haber-Bosch Process.
 - 1.3.1. Nitrogen in Figures
 - 1.3.2. Haber-Bosch Process. Process and Equipment
 - 1.3.3. Environmental Impact
- 1.4. Hydrogen in Refineries
 - 1.4.1. Hydrogen in Refineries. Necessity
 - 1.4.2. Hydrogen Used Today. Environmental Impact and Cost
 - 1.4.3. Short- and Long-Term Alternatives
- 1.5. Hydrogen in Steel Mills
 - 1.5.1. Hydrogen in Steel Mills. Necessity
 - 1.5.2. Hydrogen Used Today. Environmental Impact and Cost
 - 1.5.3. Short- and Long-Term Alternatives
- 1.6. Natural Gas Substitution: Blending
 - 1.6.1. Mixing Properties
 - 1.6.2. Problems and Required Improvements
 - 1.6.3. Opportunities
- 1.7. Injection of Hydrogen into the Natural Gas Grid
 - 1.7.1. Methodology
 - 1.7.2. Current Capabilities
 - 1.7.3. Problems





- 1.8. Hydrogen in Mobility: Types of Fuel Cells
 - 1.8.1. Context and Necessity
 - 1.8.2. Equipment and Schemes
 - 1.8.3. Currently
- 1.9. Co-generation and Production of Electricity with Fuel Cells
 - 1.9.1. Fuel Cell Production
 - 1.9.2. Discharge to the Grid
 - 1.9.3. Microgrids
- 1.10. Other Hydrogen End-Uses: Chemical, Semiconductor, Glass Industry
 - 1.10.1. Chemical Industry
 - 1.10.2. Semiconductor Industry
 - 1.10.3. Glass Industry

“

Enter a program that will bring you closer to the equipment currently used for the development of the fuel cell”

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 Hydrogen Energy Applications 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 Hydrogen Energy Applications** 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.

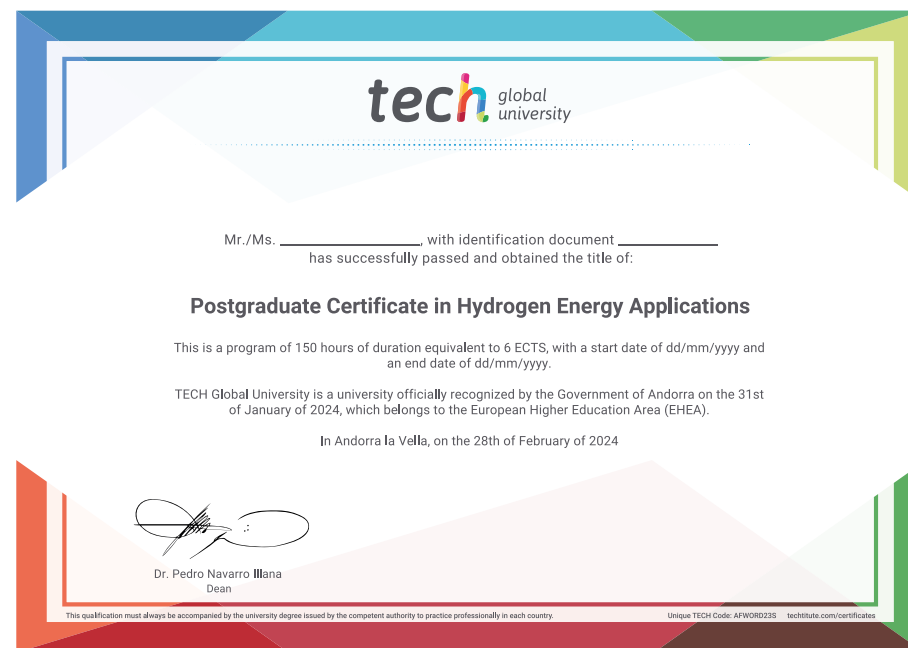
This **TECH Global University** title, is a European program of continuing education and professional updating that guarantees the acquisition of competencies in its area of knowledge, providing a high curricular value to the student who completes the program.

Title: **Postgraduate Certificate in Hydrogen Energy Applications**

Modality: **online**

Duration: **6 weeks**

Accreditation: **6 ECTS**



*Apostille Convention. In the event that the student wishes to have their paper diploma issued with an apostille, TECH GLOBAL will make the necessary arrangements to obtain it, at an additional cost.

future
health confidence people
education information tutors
guarantee accreditation teaching
institutions technology learning
community commitment
personalized service innovation
knowledge present
development language
classroom



Postgraduate Certificate Hydrogen Energy Applications

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

Postgraduate Certificate

Hydrogen Energy Applications

