Postgraduate Diploma

Hydrogen Energy Technology

tech global university

tech global university

Postgraduate Diploma
Hydrogen Energy Technology

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

Website: **www.techtitute.com/us/engineering/postgraduate-diploma/postgraduate-diploma-hydrogen-energy-technology**

Index

01

Introduction

In recent years, the need to reduce CO2 emissions into the atmosphere has driven the search for alternatives to fossil fuels. A firm commitment by both public bodies and energy companies, which have found in green hydrogen an interesting option to address this problem. This has led to raise the profile of engineering professionals specialized in the potential of this chemical element. Given this important boom in the industrial sector, TECH has created this 100% online program, which provides the most advanced knowledge about the production, storage, transport and distribution of hydrogen, the possibilities of evolution and advantages it offers to the industry, as well as the end uses in other sectors such as transportation. All this, with quality multimedia content, which will lead them to boost their professional career in a branch of activity in expansion.

This university program will make you an expert in Hydrogen Energy Technology. Enroll now"

The scarcity of fossil resources and pollution have been two of the determining factors in the search by energy companies for more sustainable alternatives with less environmental impact.As a result, in recent years there has been a strong commitment to green hydrogen as a feasible alternative in industry and the mobility sector.

The potential of this chemical element has led to boost the professional career of engineers, whose technical knowledge is essential for the achievement of the most important energy and technological projects. That is why TECH wanted to promote this career path through a Postgraduate Diploma in Hydrogen Energy Technology, with which, graduates will get to specialize in a booming sector.

Therefore, students who enter this qualification will have before them a program with a syllabus that offers a theoretical-practical vision of the use of hydrogen as a raw material in industrial processes, as a substitute for gas or electricity generator acting as support for renewable energy installations.

In addition, through innovative teaching material, students will be able to delve in a much more dynamic and enjoyable way in the properties of hydrogen, the development of its storage, transport and distribution. The existing problems to these processes and the current reality of both large-scale logistics and the sector.

A 100% online Postgraduate Diploma, which can be followed comfortably whenever and wherever you want. They only need an electronic device with internet connection to be able to visualize, at any time, the syllabus hosted on the virtual platform. In this way, professionals are faced with an educational option designed so that they can balance their personal responsibilities with a quality university education.

This **Postgraduate Diploma in Hydrogen Energy Technology** contains the most complete and up-to-date program on the market. Its most notable features are:

- 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 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

An extensive library of multimedia resources is available 24 hours a day, 7 days a week"

Thanks to this program you will be able to develop the different possibilities of storage, transportation and distribution of hydrogen"

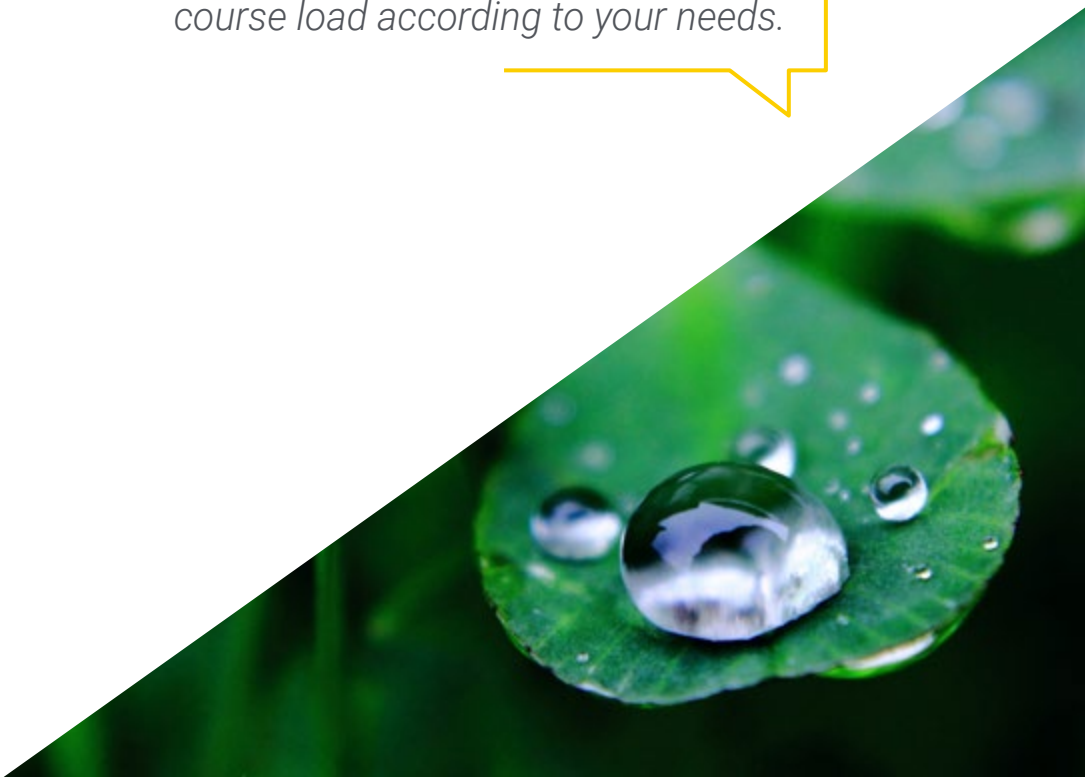
TECH has designed this Postgraduate Diploma for you to grow professionally in a booming hydrogen sector.

Enroll now in a qualification that gives you the freedom to distribute the course load according to your needs.

The program's teaching staff includes professionals from the sector 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 professionals must try to solve the different professional practice situations that arise during the academic year. For this purpose, the student will be assisted by an innovative interactive video system created by renowned and experienced experts.



02

Objectives

Thanks to the knowledge acquired throughout the 6 months of this university program, students will be able to interpret and analyze the different uses of hydrogen, as well as its potential in the creation of future energy projects. As such, at the end of this program, graduates will be able to develop the different possibilities of hydrogen storage, transportation and distribution, as well as to integrate hydrogen in fuel cell vehicles. The specialized faculty, which is part of this program, will be responsible for guiding the professionals in the successful achievement of these goals.

Get through the case studies an eminently practical view of the different uses of hydrogen in the industry"

General Objectives

- Educate students in the interpretation and in-depth analysis of hydrogen.
- Compile the breadth of concepts and knowledge necessary to delve into the field of the use of hydrogen as an energy vector
- Develop specialized knowledge of the world of hydrogen and an in-depth understanding of its potential as an energy vector

With this university qualification, you will learn about the situation of hydrogen use in the global energy mix"

Specific Objectives

Module 1. Hydrogen as an Energy Vector

- Interpret in depth the singularities of the hydrogen environment
- Examine the existing legislative framework in the hydrogen environment
- Evaluate the hydrogen value chain players, as well as the needs to achieve the Hydrogen Economy
- In-depth knowledge of hydrogen as a molecule
- Determine the most relevant concepts of the hydrogen environment
- Analyze the integration of hydrogen in hydrogen infrastructures

Module 2. Hydrogen Storage, Transportation and Distribution

- Develop the different possibilities for hydrogen storage, transportation and distribution
- Determine the different ways of transporting, storing and distributing hydrogen
- Analyze the possibilities and limitations of hydrogen export
- In-depth analysis of the techno-economic analysis of large-scale hydrogen logistics

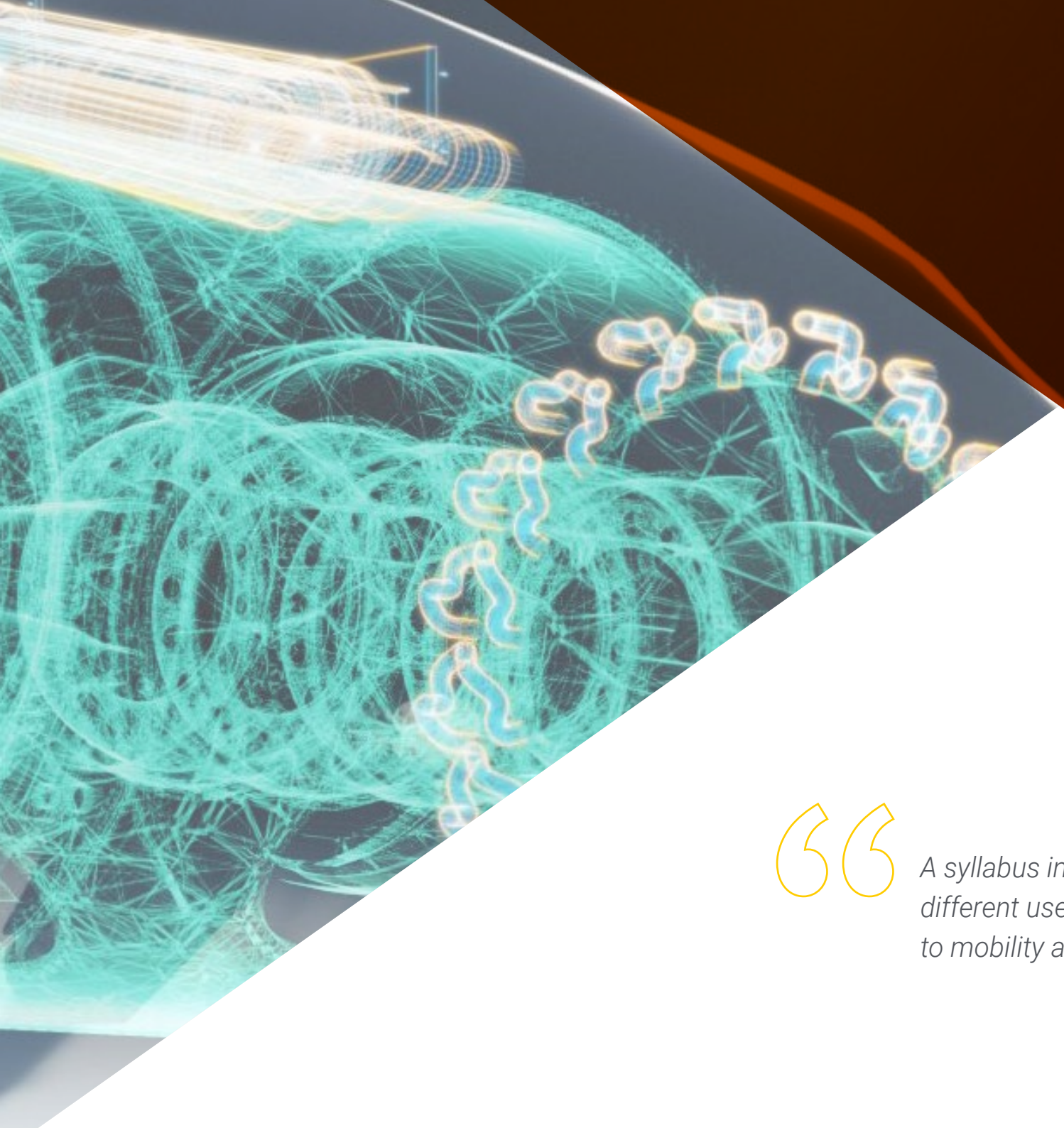
Module 3. Hydrogen End-Uses

- Educate 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

03

Structure and Content

The syllabus of this university qualification has been prepared by an excellent teaching team made up of top-level professionals in the field of engineering and the use of hydrogen in industrial projects. This is reflected in the syllabus of this program, where graduates will make an intensive tour of the global and current context of hydrogen as an energy vector, the elements that influence the transportation, storage, distribution and its uses. The content of this teaching is complemented by multimedia educational resources, specialized readings and case studies to which they will have access 24 hours a day, from any electronic device with an Internet connection.



A syllabus in which you will delve into the different uses of hydrogen from industry to mobility and energy production"

Module 1. Hydrogen as an Energy Vector

1.1. Hydrogen as an Energy Vector. Global Context and Necessity
- 1.1.1. Political and Social Context
- 1.1.2. Paris CO2 Emission Reduction Commitment
- 1.1.3. Circularity

1.2. Hydrogen Development
- 1.2.1. Discovery and Production of Hydrogen
- 1.2.2. Role of Hydrogen in Industrial Society
- 1.2.3. Hydrogen at Present

1.3. Hydrogen as a Chemical Element: Properties
- 1.3.1. Properties
- 1.3.2. Permeability
- 1.3.3. Flammability and Buoyancy Index

1.4. Hydrogen as a Fuel
- 1.4.1. Hydrogen Production
- 1.4.2. Hydrogen Storage and Distribution
- 1.4.3. The Use of Hydrogen as a Fuel

1.5. Hydrogen Economy
- 1.5.1. Decarbonization of the Economy
- 1.5.2. Renewable Energy Sources
- 1.5.3. The Road to the Hydrogen Economy

1.6. Hydrogen Value Chain
- 1.6.1. Production
- 1.6.2. Storage and Transportation
- 1.6.3. End Uses

1.7. Integration with Existing Energy Infrastructures: Hydrogen as an Energy Vector
- 1.7.1. Regulations
- 1.7.2. Problems Associated with Hydrogen Embrittlement
- 1.7.3. Integration of Hydrogen in Energy Infrastructures. Trends and Realities

1.8. Hydrogen Technologies. Status
- 1.8.1. Hydrogen Technologies
- 1.8.2. Technologies under Development
- 1.8.3. Key Projects for Hydrogen Development

1.9. "Relevant" Type Projects
- 1.9.1. Production Projects
- 1.9.2. Flagship Projects in Storage and Transportation
- 1.9.3. Projects for the Application of Hydrogen as an Energy Vector

1.10. Hydrogen in the Global Energy Mix: Current Situation and Prospects
- 1.10.1. The Energy Mix. Global Context
- 1.10.2. Hydrogen in the Energy Mix. Current Situation
- 1.10.3. Development Pathways for Hydrogen. Perspectives

Module 2. Hydrogen Storage, Transportation and Distribution

2.1. Hydrogen Storage, Transportation, and Distribution Forms
- 2.1.1. Hydrogen Gas
- 2.1.2. Liquid Hydrogen
- 2.1.3. Hydrogen Storage in Solid State

2.2. Hydrogen Compression
- 2.2.1. Hydrogen Compression. Necessity
- 2.2.2. Problems Associated with the Compression of Hydrogen
- 2.2.3. Equipment

2.3. Gaseous State Storage
- 2.3.1. Problems Associated with Hydrogen Storage
- 2.3.2. Types of Storage Tanks
- 2.3.3. Storage Tank Capacities

2.4. Transportation and Distribution in Gaseous State
- 2.4.1. Transportation and Distribution in Gaseous State
- 2.4.2. Distribution by Road
- 2.4.3. Use of the Distribution Network

2.5. Hydrogen Storage, Transportation and Distribution as Liquid
- 2.5.1. Process and Conditions
- 2.5.2. Equipment
- 2.5.3. Current State

2.6. Storage, Transportation and Distribution as Methanol
- 2.6.1. Process and Conditions
- 2.6.2. Equipment
- 2.6.3. Current State

2.7. Storage, Transportation and Distribution as Green Ammonia
- 2.7.1. Process and Conditions
- 2.7.2. Equipment
- 2.7.3. Current State

2.8. Storage, Transportation and Distribution as LOHC (Liquid Organic Hydrogen)
- 2.8.1. Process and Conditions
- 2.8.2. Equipment
- 2.8.3. Current State

2.9. Hydrogen Export
- 2.9.1. Hydrogen Export. Necessity
- 2.9.2. Green Hydrogen Production Capabilities
- 2.9.3. Transportation. Technical Comparison

2.10. Comparative Techno-Economic Analysis of Alternatives for Large Scale Logistics
- 2.10.1. Cost of Hydrogen Export
- 2.10.2. Comparison between Different Means of Transportation
- 2.10.3. The Reality of Large-Scale Logistics

Module 3. Hydrogen End Uses

3.1. Industrial Uses of Hydrogen
- 3.1.1. Hydrogen at Industries
- 3.1.2. Origin of Hydrogen Used in Industry. Environmental Impact
- 3.1.3. Industrial Uses in the Industry

3.2. Industries and Hydrogen e-Fuels Production
- 3.2.1. e-Fuel Versus Traditional Fuels
- 3.2.2. Classification of e-Fuels
- 3.2.3. Current Status of e-Fuels

3.3. Production of Ammonia: Haber-Bosch Process
- 3.3.1. Nitrogen in Figures
- 3.3.2. Haber-Bosch Process. Process and Equipment
- 3.3.3. Environmental Impact

3.4. Hydrogen in Refineries
- 3.4.1. Hydrogen in Refineries. Necessity
- 3.4.2. Hydrogen Used Today. Environmental Impact and Cost
- 3.4.3. Short- and Long-Term Alternatives

3.5. Hydrogen in Steel Mills
- 3.5.1. Hydrogen in Steel Mills. Necessity
- 3.5.2. Hydrogen Used Today. Environmental Impact and Cost
- 3.5.3. Short- and Long-Term Alternatives

3.6. Natural Gas Substitution: *Blending*
- 3.6.1. Mixing Properties
- 3.6.2. Problems and Required Improvements
- 3.6.3. Opportunities

3.7. Injection of Hydrogen into the Natural Gas Grid
- 3.7.1. Methodology
- 3.7.2. Current Capabilities
- 3.7.3. Problems

3.8. Hydrogen in Mobility: Fuel Cell Vehicles
- 3.8.1. Context and Necessity
- 3.8.2. Equipment and Schemes
- 3.8.3. Present

3.9. Cogeneration and Production of Electricity with Fuel Cells
- 3.9.1. Fuel Cell Production
- 3.9.2. Discharge to the Grid
- 3.9.3. Microgrids

3.10. Others Hydrogen End-Uses: Chemical, Semiconductor, Glass Industry
- 3.10.1. Chemical Industry
- 3.10.2. Semiconductor Industry
- 3.10.3. Glass Industry

Enter a program that will lead you to unravel the potential of using hydrogen as a feedstock for the production of e-Fuels"

04

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

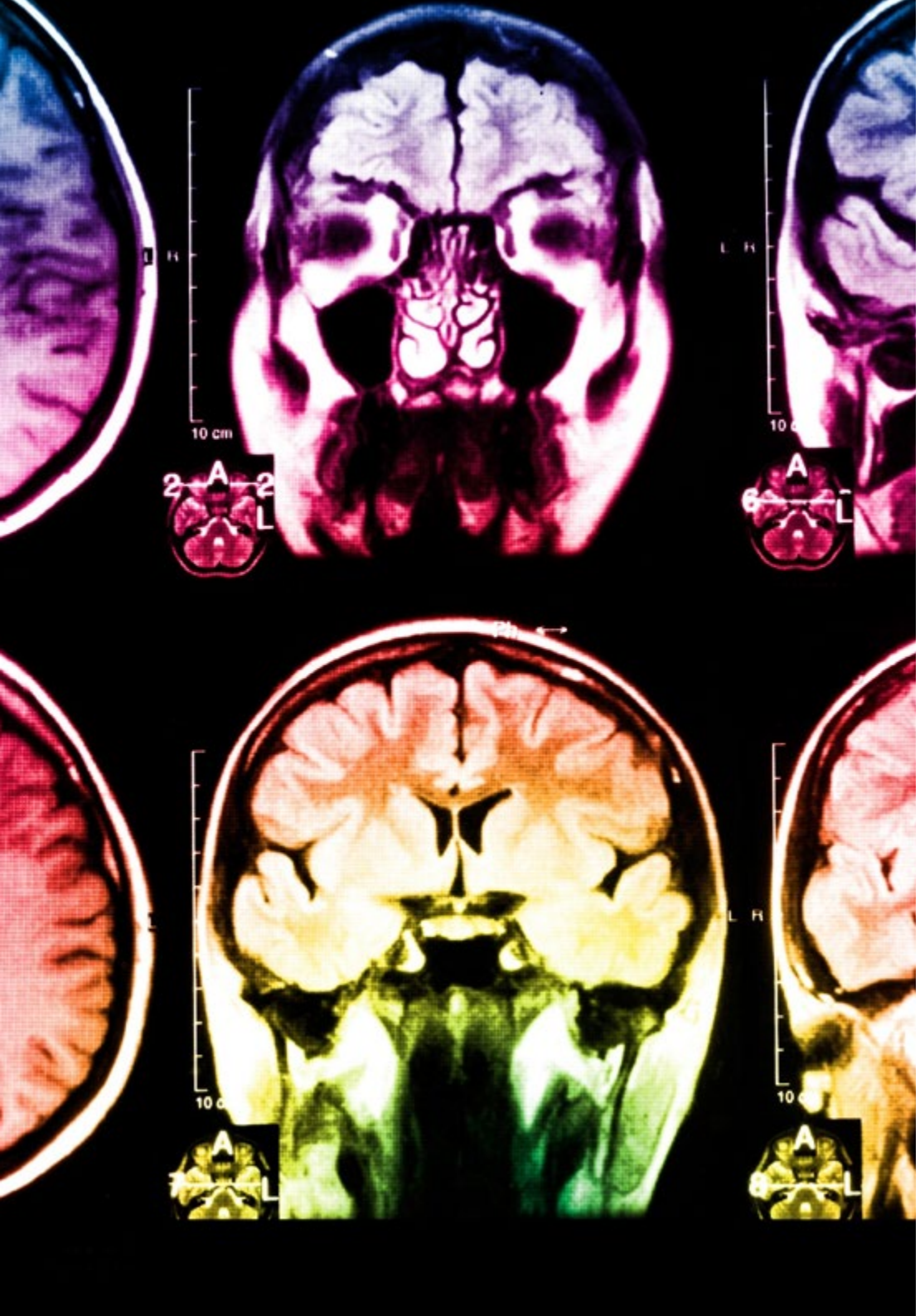
TECH effectively combines the Case Study methodology with a 100% online learning system based on repetition, which combines 8 different teaching elements in each lesson.

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.

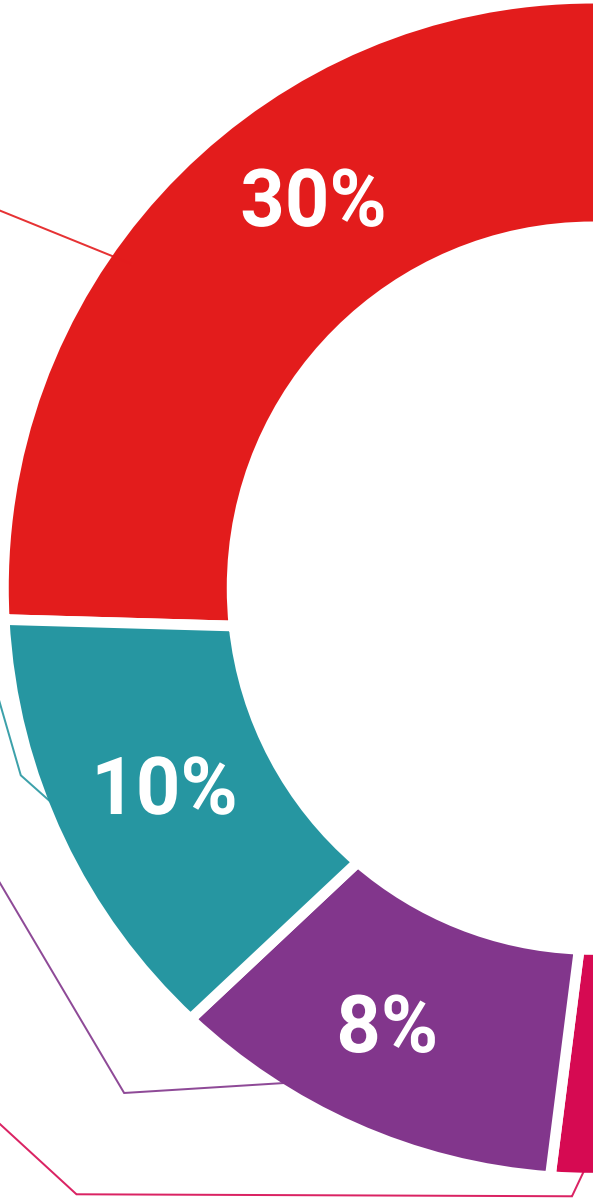
Learning from an Expert strengthens knowledge and memory, and generates confidence in future difficult decisions.

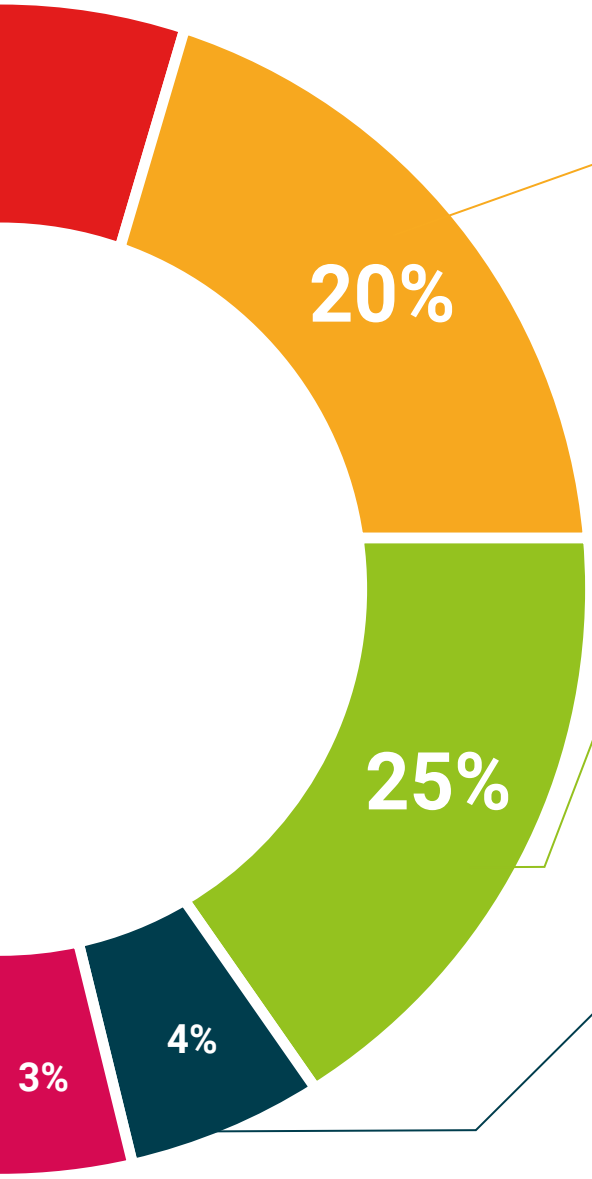
Practising Skills and Abilities

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.

05

Certificate

The Postgraduate Diploma in Hydrogen Energy Technology guarantees students, in addition to the most rigorous and up-to-date education, access to a Postgraduate Diploma 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 Diploma in Hydrogen Energy Technology** 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 Diploma in Hydrogen Energy Technology**

Modality: **online**

Duration: **6 months**

Accreditation: **18 ECTS**


tech global university

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

Postgraduate Diploma in Hydrogen Energy Technology

This is a program of 450 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

Dr. Pedro Navarro Illana
Rector

This qualification must always be accompanied by the university degree issued by the competent authority to practice professionally in each country. Unique TECH Code: AFWORD23S techtitute.com/certificates

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

tech global university

Postgraduate Diploma
Hydrogen Energy Technology

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

Postgraduate Diploma

Hydrogen Energy Technology

tech global university