Professional Master's Degree
Hydrogen Technology

Accreditation/Membership

ASEE American Society for Engineering Education

tech global university

Professional Master's Degree
Hydrogen Technology

» Modality: **online**
» Duration: **12 months**
» Certificate: **TECH Global University**
» Accreditation: **60 ECTS**
» Schedule: **at your own pace**
» Exams: **online**

Website: **www.techtitute.com/us/engineering/professional-master-degree/master-hydrogen-technology**

Index

01

Introduction to the Program

According to the International Energy Agency, hydrogen could represent 18% of global energy demand by 2050. This figure confirms its key role in the transition toward clean energy sources. In the race to develop the most advanced technological projects based on this chemical element and to reduce fossil fuel consumption, multinational companies are promoting initiatives that require engineering professionals with highly specialized training. For this reason, TECH has created this university qualification which delves into the most relevant scientific and technical aspects of hydrogen generation, transport, and use, as well as the economic factors to be considered for its development.

A comprehensive and 100% online program, exclusive to TECH, with an international perspective backed by our membership in the American Society for Engineering Education"

Climate change, the scarcity of fossil resources, and the progressive deterioration of the environment have driven both public and private institutions to make a strong commitment to cleaner and more sustainable energy sources. In this context, hydrogen has emerged as one of the most promising energy vectors, supported by major energy companies seeking to maintain their leadership through technological innovation.

This scenario creates highly favorable professional opportunities for engineering graduates who wish to specialize in a constantly expanding field. However, this requires highly qualified professionals with a global vision of the sector and advanced technical knowledge of each link in its value chain: production, storage, transport, distribution, and final application. As such, this university program represents an excellent opportunity for engineering professionals who want to advance their careers from anywhere and at any time.

Throughout the program, students will delve into key aspects such as fuel cells, hydrogen refueling stations for vehicles, current regulations, emerging markets, and applicable safety criteria. In addition, they will benefit from dynamic teaching resources, case studies, and multimedia content that will equip them to successfully address the planning, management, and techno-economic evaluation of projects linked to this technology. As a complement, participants will also receive the academic support of 10 rigorous Masterclasses delivered by a distinguished International Guest Director.

Thanks to TECH's membership in the **American Society for Engineering Education (ASEE)**, its students gain free access to annual conferences and regional workshops that enrich their engineering education. Additionally, they enjoy online access to specialized publications such as Prism and the Journal of Engineering Education, enhancing their academic development and expanding their professional network on an international scale.

This **Professional Master's Degree in Hydrogen Technology** contains the most complete and up-to-date university program on the market. Its most notable features are:

- The development of practical case studies presented by experts in Hydrogen Technology
- 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

A renowned International Guest Director will deliver exclusive Masterclasses on the latest innovations in hydrogen technology"

Specialize in hydrogen production from biomass using techniques such as gasification and pyrolysis"

Discover how hydrogen is obtained as a byproduct in petrochemical and chlor-alkali processes.

Delve into the generation, transport, and use of hydrogen in innovative vehicle projects.

The teaching staff includes professionals from the field of hydrogen technology who contribute their work experience to this program, along with distinguished 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 an immersive learning experience designed to prepare for real-life situations.

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

02

Why Study at TECH?

TECH is the world's largest online university. With an impressive catalog of more than 14,000 university programs, available in 11 languages, it is positioned as a leader in employability, with a 99% job placement rate. In addition, it has a huge faculty of more than 6,000 professors of the highest international prestige.

Study at the largest online university in the world and ensure your professional success. The future begins at TECH”

The world's best online university, according to FORBES

The prestigious Forbes magazine, specialized in business and finance, has highlighted TECH as "the best online university in the world" This is what they have recently stated in an article in their digital edition in which they echo the success story of this institution, "thanks to the academic offer it provides, the selection of its teaching staff, and an innovative learning method oriented to form the professionals of the future".

The best top international faculty

TECH's faculty is made up of more than 6,000 professors of the highest international prestige. Professors, researchers and top executives of multinational companies, including Isaiah Covington, performance coach of the Boston Celtics; Magda Romanska, principal investigator at Harvard MetaLAB; Ignacio Wistumba, chairman of the department of translational molecular pathology at MD Anderson Cancer Center; and D.W. Pine, creative director of TIME magazine, among others.

The world's largest online university

TECH is the world's largest online university. We are the largest educational institution, with the best and widest digital educational catalog, one hundred percent online and covering most areas of knowledge. We offer the largest selection of our own degrees and accredited online undergraduate and postgraduate degrees. In total, more than 14,000 university programs, in ten different languages, making us the largest educational institution in the world.

The most complete syllabuses on the university scene

TECH offers the most complete syllabuses on the university scene, with programs that cover fundamental concepts and, at the same time, the main scientific advances in their specific scientific areas. In addition, these programs are continuously updated to guarantee students the academic vanguard and the most demanded professional skills. and the most in-demand professional competencies. In this way, the university's qualifications provide its graduates with a significant advantage to propel their careers to success.

A unique learning method

TECH is the first university to use Relearning in all its programs. This is the best online learning methodology, accredited with international teaching quality certifications, provided by prestigious educational agencies. In addition, this innovative academic model is complemented by the "Case Method", thereby configuring a unique online teaching strategy. Innovative teaching resources are also implemented, including detailed videos, infographics and interactive summaries.

The official online university of the NBA

TECH is the official online university of the NBA. Thanks to our agreement with the biggest league in basketball, we offer our students exclusive university programs, as well as a wide variety of educational resources focused on the business of the league and other areas of the sports industry. Each program is made up of a uniquely designed syllabus and features exceptional guest hosts: professionals with a distinguished sports background who will offer their expertise on the most relevant topics.

Leaders in employability

TECH has become the leading university in employability. Ninety-nine percent of its students obtain jobs in the academic field they have studied within one year of completing any of the university's programs. A similar number achieve immediate career enhancement. All this thanks to a study methodology that bases its effectiveness on the acquisition of practical skills, which are absolutely necessary for professional development.

Google Premier Partner

The American technology giant has awarded TECH the Google Premier Partner badge. This award, which is only available to 3% of the world's companies, highlights the efficient, flexible and tailored experience that this university provides to students. The recognition not only accredits the maximum rigor, performance and investment in TECH's digital infrastructures, but also places this university as one of the world's leading technology companies.

The top-rated university by its students

Students have positioned TECH as the world's top-rated university on the main review websites, with a highest rating of 4.9 out of 5, obtained from more than 1,000 reviews. These results consolidate TECH as the benchmark university institution at an international level, reflecting the excellence and positive impact of its educational model.

03

Syllabus

The contents of this Professional Master's Degree have been designed by specialists in energy engineering and sustainability. Thanks to this approach, the curriculum explores the hydrogen value chain in depth, from its production through electrolysis to its final use in mobility, industry, and power generation. The syllabus covers technical, regulatory, and economic aspects, as well as project management tools and feasibility analysis. In this way, graduates will be prepared to lead strategic projects in the hydrogen sector and contribute to the transition toward a cleaner and more efficient energy model.

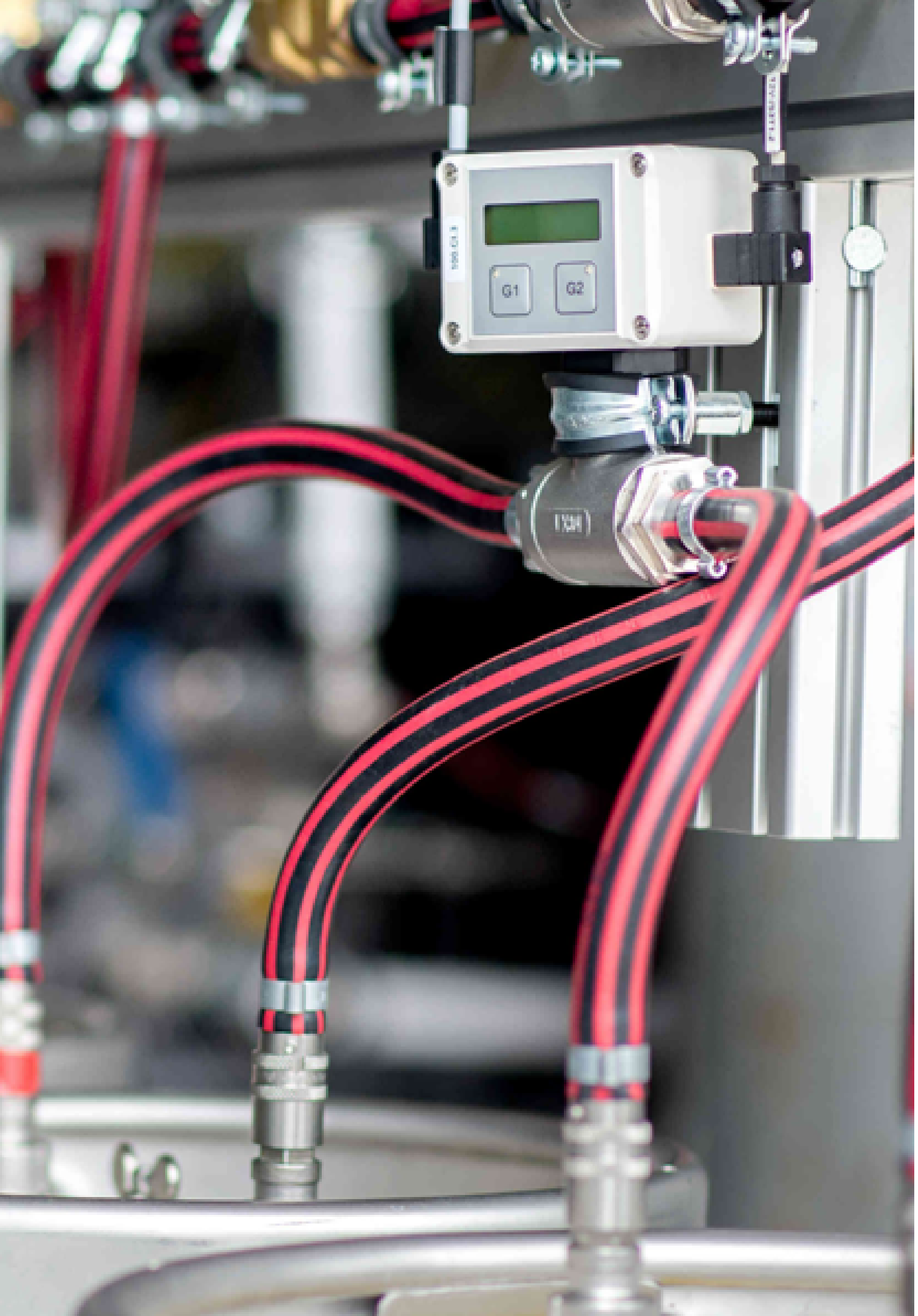
Study the innovative methods of water separation for the production of green hydrogen"

Module 1. Hydrogen as an Energy Vector

1.1. Hydrogen as an Energy Vector. Global Context and Need
   1.1.1. Political and Social Context
   1.1.2. Paris Agreement on CO_2 Emission Reduction
   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 Today
1.3. Hydrogen as a Chemical Element: Properties
   1.3.1. Properties
   1.3.2. Permeability
   1.3.3. Flammability Index and Buoyancy
1.4. Hydrogen as a Fuel
   1.4.1. Production of Hydrogen
   1.4.2. Storage and Distribution of Hydrogen
   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 Path Toward the Hydrogen Economy
1.6. Hydrogen Value Chain
   1.6.1. Production
   1.6.2. Storage and Transportation
   1.6.3. Final Uses
1.7. Integration with Existing Energy Infrastructures: Hydrogen as an Energy Vector
   1.7.1. Regulations
   1.7.2. Issues Related to Hydrogen Embrittlement
   1.7.3. Integration of Hydrogen into Energy Infrastructures. Trends and Realities
1.8. Hydrogen Technologies. Current Status
   1.8.1. Hydrogen Technologies
   1.8.2. Technologies in Development
   1.8.3. Key Projects for Hydrogen Development
1.9. Relevant "Model Projects"
   1.9.1. Production Projects
   1.9.2. Flagship Projects in Storage and Transport
   1.9.3. Projects Applying Hydrogen as an Energy Vector
1.10. Hydrogen in the Global Energy Mix: Current Situation and Perspectives
   1.10.1. The Energy Mix. Global Context
   1.10.2. Hydrogen in the Energy Mix. Current Situation
   1.10.3. Pathways for Hydrogen Development. Perspectives

Module 2. Hydrogen Production and Electrolysis

2.1. Production from Fossil Fuels
   2.1.1. Production by Hydrocarbon Reforming
   2.1.2. Generation through Pyrolysis
   2.1.3. Coal Gasification
2.2. Production From Biomass
   2.2.1. Hydrogen Production by Biomass Gasification
   2.2.2. Hydrogen Generation through Biomass Pyrolysis
   2.2.3. Aqueous Reforming
2.3. Biological Production
   2.3.1. Water Gas Shift Reaction (WGSR)
   2.3.2. Dark Fermentation for Biohydrogen Generation
   2.3.3. Photofermentation of Organic Compounds for Hydrogen Production
2.4. By-Product of Chemical Processes
   2.4.1. Hydrogen as a By-Product of Petrochemical Processes
   2.4.2. Hydrogen as a By-Product of Caustic Soda and Chlorine Production
   2.4.3. Synthesis Gas as a By-Product Generated in Coke Ovens



2.5. Water Separation
- 2.5.1. Photolytic Hydrogen Formation
- 2.5.2. Hydrogen Generation by Photocatalysis
- 2.5.3. Hydrogen Production by Thermal Water Splitting

2.6. Electrolysis: the Future of Hydrogen Generation
- 2.6.1. Hydrogen Generation by Electrolysis
- 2.6.2. Oxidation-Reduction Reaction
- 2.6.3. Thermodynamics of Electrolysis

2.7. Electrolysis Technologies
- 2.7.1. Low-Temperature Electrolysis: Alkaline and Anionic Technology
- 2.7.2. Low Temperature Electrolysis: PEM
- 2.7.3. High-Temperature Electrolysis

2.8. Stack: The Heart of an Electrolyzer
- 2.8.1. Materials and Components in Low-Temperature Electrolysis
- 2.8.2. Materials and Components in High-Temperature Electrolysis
- 2.8.3. Stack Assembly in Electrolysis

2.9. Balance of Plant and System
- 2.9.1. Balance of Plant Components
- 2.9.2. Balance of Plant Design
- 2.9.3. Balance of Plant Optimization

2.10. Technical and Economic Characterization of Electrolyzers
- 2.10.1. Capital and Operating Costs
- 2.10.2. Technical Characterization of an Electrolyzer Operation
- 2.10.3. Techno-Economic Modeling

Module 3. Hydrogen Storage, Transportation and Distribution

3.1. Hydrogen Storage, Transportation, and Distribution Forms
- 3.1.1. Hydrogen Gas
- 3.1.2. Liquid Hydrogen
- 3.1.3. Hydrogen Storage in Solid State

3.2. Hydrogen Compression
- 3.2.1. Hydrogen Compression. Need
- 3.2.2. Problems Associated with the Compression of Hydrogen
- 3.2.3. Equipment

3.3. Gaseous State Storage
- 3.3.1. Problems Associated with Hydrogen Storage
- 3.3.2. Types of Storage Tanks
- 3.3.3. Storage Tank Capacities

3.4. Transportation and Distribution in Gaseous State
- 3.4.1. Transportation and Distribution in Gaseous State
- 3.4.2. Distribution by Road
- 3.4.3. Use of the Distribution Network

3.5. Hydrogen Storage, Transportation and Distribution as Liquid
- 3.5.1. Process and Conditions
- 3.5.2. Equipment
- 3.5.3. Current Status

3.6. Storage, Transportation and Distribution as Methanol
- 3.6.1. Process and Conditions
- 3.6.2. Equipment
- 3.6.3. Current Status

3.7. Storage, Transportation and Distribution as Green Ammonia
- 3.7.1. Process and Conditions
- 3.7.2. Equipment
- 3.7.3. Current Status

3.8. Storage, Transportation and Distribution as LOHC (Liquid Organic Hydrogen Carriers)
- 3.8.1. Process and Conditions
- 3.8.2. Equipment
- 3.8.3. Current Status

3.9. Hydrogen Export
- 3.9.1. Hydrogen Export. Need
- 3.9.2. Production Capacities of Green Hydrogen
- 3.9.3. Transportation: Technical Comparison

3.10. Techno-Economic Comparative Analysis of Large-Scale Logistics Alternatives
- 3.10.1. Cost of Hydrogen Export
- 3.10.2. Comparison of Different Means of Transport
- 3.10.3. The Reality of Large-Scale Logistics

Module 4. Final Uses of Hydrogen

4.1. Industrial Uses of Hydrogen
- 4.1.1. Hydrogen in Industry
- 4.1.2. Origin of the Hydrogen Used in Industry. Environmental Impact
- 4.1.3. Industrial Applications in Industry

4.2. Industries and Hydrogen: Production of e-Fuels
- 4.2.1. e-Fuel Versus Traditional Fuels
- 4.2.2. Classification of e-Fuels
- 4.2.3. Current Status of e-Fuels

4.3. Ammonia Production: The Haber-Bosch Process
- 4.3.1. Nitrogen in Figures
- 4.3.2. Haber-Bosch Process. Process and Equipment
- 4.3.3. Environmental Impact

4.4. Hydrogen in Refineries
- 4.4.1. Hydrogen in Refineries. Need
- 4.4.2. Hydrogen Used Today. Environmental Impact and Cost
- 4.4.3. Short- and Long-Term Alternatives

4.5. Hydrogen in Steel Plants
- 4.5.1. Hydrogen in Steel Plants. Need
- 4.5.2. Hydrogen Used Today. Environmental Impact and Cost
- 4.5.3. Short- and Long-Term Alternatives

4.6. Natural Gas Substitution: *Blending*
- 4.6.1. Properties of the Blend
- 4.6.2. Challenges and Required Improvements
- 4.6.3. Opportunities

4.7. Injection of Hydrogen into the Natural Gas Network
- 4.7.1. Methodology
- 4.7.2. Current Capacities
- 4.7.3. Challenges

4.8. Hydrogen in Mobility: Fuel Cell Vehicles
   4.8.1. Context and Need
   4.8.2. Equipment and Schemes
   4.8.3. Current Status
4.9. Cogeneration and Electricity Production with Fuel Cells
   4.9.1. Production with Fuel Cells
   4.9.2. Grid Injection
   4.9.3. Microgrids
4.10. Other Final Uses of Hydrogen: Chemical, Semiconductor, and Glass Industries
   4.10.1. Chemical Industry
   4.10.2. Semiconductor Industry
   4.10.3. Glass Industry

Module 5. Hydrogen Fuel Cells

5.1. PEMFC (Proton-Exchange Membrane Fuel Cell)
   5.1.1. Chemistry Governing PEMFCs
   5.1.2. Operation of the PEMFC
   5.1.3. Applications of PEMFCs
5.2. Membrane-Electrode Assembly in PEMFCs
   5.2.1. Materials and Components of MEA
   5.2.2. Catalysts in PEMFCs
   5.2.3. Circularity in PEMFC
5.3. Stack in PEMFCs
   5.3.1. Stack Architecture
   5.3.2. Assembly
   5.3.3. Current Generation
5.4. Balance of Plant and System in PEMFCs
   5.4.1. Components of the Balance of Plant
   5.4.2. Balance of Plant Design
   5.4.3. System Optimization
5.5. SOFC (Solid Oxide Fuel Cells)
   5.5.1. Chemistry Governing SOFCs
   5.5.2. Operation of SOFCs
   5.5.3. Applications of SOFCs
5.6. Other Types of Fuel Cells: Alkaline, Reversible, Direct Methanation
   5.6.1. Alkaline Fuel Cells
   5.6.2. Reversible Fuel Cells
   5.6.3. Direct Methanation Fuel Cells
5.7. Applications of Fuel Cells I. In Mobility, Power Generation, Thermal Generation
   5.7.1. Fuel Cells in Mobility
   5.7.2. Fuel Cells in Power Generation
   5.7.3. Fuel Cells in Thermal Generation
5.8. Fuel Cell Applications II. Techno-Economic Modeling
   5.8.1. Technical and Economic Characterization of PEMFCs
   5.8.2. Capital and Operating Costs
   5.8.3. Technical Characterization of PEMFC Performance
   5.8.4. Techno-Economic Modeling
5.9. Sizing PEMFCs for Different Applications
   5.9.1. Static Modeling
   5.9.2. Dynamic Modeling
   5.9.3. Integration of PEMFCs in Vehicles
5.10. Grid Integration of Stationary Fuel Cells
   5.10.1. Stationary Fuel Cells in Renewable Microgrids
   5.10.2. System Modeling
   5.10.3. Techno-Economic Study of a Stationary Fuel Cell

Module 6. Hydrogen Refueling Stations

6.1. Hydrogen Vehicle Refueling Corridors and Networks
- 6.1.1. Hydrogen Vehicle Refueling Networks. Current Status
- 6.1.2. Global Hydrogen Vehicle Refueling Station Deployment Targets
- 6.1.3. Cross-Border Corridors for Hydrogen Refueling

6.2. Types of Hydrogen Refueling Stations, Modes of Operation, and Dispensing Categories
- 6.2.1. Types of Hydrogen Refueling Stations
- 6.2.2. Operational Modes of Hydrogen Refueling Stations
- 6.2.3. Dispensing Categories According to Standards

6.3. Design Parameters
- 6.3.1. Hydrogen Refueling Station. Elements
- 6.3.2. Design Parameters Based on Hydrogen Storage Type
- 6.3.3. Design Parameters Based on Intended Station Use

6.4. Storage and Pressure Levels
- 6.4.1. Storage of Gaseous Hydrogen in Refueling Stations
- 6.4.2. Pressure Levels in Gas Storage
- 6.4.3. Storage of Liquid Hydrogen in Refueling Stations

6.5. Compression Stages
- 6.5.1. Hydrogen Compression. Need
- 6.5.2. Compression Technologies
- 6.5.3. Optimization

6.6. Dispensing and Precooling
- 6.6.1. Precooling by Standard and Vehicle Type. Need
- 6.6.2. Cascade Hydrogen Dispensing
- 6.6.3. Thermal Phenomena in Dispensing

6.7. Mechanical Integration
- 6.7.1. On-Site Hydrogen Production Refueling Stations
- 6.7.2. Refueling Stations Without On-Site Hydrogen Production
- 6.7.3. Modularization

6.8. Applicable Regulations
- 6.8.1. Safety Regulations
- 6.8.2. Hydrogen Quality Standards and Certifications
- 6.8.3. Civil Regulations

6.9. Preliminary Design of a Hydrogen Refueling Station
- 6.9.1. Case Study Presentation
- 6.9.2. Case Study Development
- 6.9.3. Resolution

6.10. Cost Analysis
- 6.10.1. Capital and Operating Costs
- 6.10.2. Technical Characterization of a Hydrogen Refueling Station's Operation
- 6.10.3. Techno-Economic Modeling

Module 7. Hydrogen Markets

7.1. Energy Markets
- 7.1.1. Integration of Hydrogen in the Gas Market
- 7.1.2. Interaction of Hydrogen Price with Fossil Fuels Prices
- 7.1.3. Interaction of the Hydrogen Price with the Electricity Market Prices

7.2. Calculation of LCOHs and Sales Price Ranges
- 7.2.1. Presentation of the Case Study
- 7.2.2. Development of the Case Study
- 7.2.3. Resolution

- 7.3. Global Demand Analysis
  - 7.3.1. Current Hydrogen Demand
  - 7.3.2. Hydrogen Demand from New Applications
  - 7.3.3. Objectives for 2050
- 7.4. Analysis of Hydrogen Production and Types
  - 7.4.1. Current Hydrogen Production
  - 7.4.2. Green Hydrogen Production Plans
  - 7.4.3. Impact of Hydrogen Production on the Global Energy System
- 7.5. International Roadmaps and Plans
  - 7.5.1. Presentation of International Plans
  - 7.5.2. Analysis of International Plans
  - 7.5.3. Comparison of Different International Plans
- 7.6. Potential Green Hydrogen Market
  - 7.6.1. Green Hydrogen in the Natural Gas Network
  - 7.6.2. Green Hydrogen in Mobility
  - 7.6.3. Green Hydrogen in Industries
- 7.7. Large-Scale Projects in Deployment: U.S, Japan, Europe, China
  - 7.7.1. Project Selection
  - 7.7.2. Analysis of Selected Projects
  - 7.7.3. Conclusions
- 7.8. Centralization of Production: Countries with Export and Import Potential
  - 7.8.1. Renewable Hydrogen Production Potential
  - 7.8.2. Renewable Hydrogen Import Potential
  - 7.8.3. Large-Volume Hydrogen Transport
- 7.9. Guarantees of Origin
  - 7.9.1. Need for a Guarantees of Origin System
  - 7.9.2. CertifHy
  - 7.9.3. Approved Guarantees of Origin Systems
- 7.10. Hydrogen Supply Contracts: *Offtake Contracts*
  - 7.10.1. Importance of Offtake Agreements for Hydrogen Projects
  - 7.10.2. Key Elements of Offtake Agreements: Price, Volume and Duration
  - 7.10.3. Review of a Standard Contract Structure

Module 8. Regulatory and Safety Aspects of Hydrogen

- 8.1. EU Policies
  - 8.1.1. European Hydrogen Strategy
  - 8.1.2. REPowerEU Plan
  - 8.1.3. Hydrogen Roadmaps in Europe
- 8.2. Incentive Mechanisms for the Deployment of the Hydrogen Economy
  - 8.2.1. Need for Incentive Mechanisms for the Deployment of the Hydrogen Economy
  - 8.2.2. European-Level Incentives
  - 8.2.3. Examples of Incentives in European Countries
- 8.3. Applicable Regulations for Production, Storage, Mobility, and Integration into the Gas Grid
  - 8.3.1. Applicable Regulation for Production and Storage
  - 8.3.2. Regulations for the Use of Hydrogen in Mobility
  - 8.3.3. Regulations for the Use of Hydrogen in the Gas Grid
- 8.4. Standards and Best Practices in Safety Plan Implementation
  - 8.4.1. Applicable Standards: CEN/CELEC
  - 8.4.2. Best Practices in Safety Plan Implementation
  - 8.4.3. Hydrogen Valleys
- 8.5. Required Project Documentation
  - 8.5.1. Technical Projects
  - 8.5.2. Environmental Documentation
  - 8.5.3. Certification
- 8.6. European Directives. Application Key: PED, ATEX, LVD, MD and EMC
  - 8.6.1. Pressure Equipment Regulations
  - 8.6.2. Explosive Atmosphere Regulations
  - 8.6.3. Chemical Storage Regulations
- 8.7. International Hazard Identification Standards: HAZID/HAZOP Analysis
  - 8.7.1. Hazard Analysis Methodology
  - 8.7.2. Risk Analysis Requirements
  - 8.7.3. Execution of Risk Analysis

8.8. Plant Safety Integrity Level Analysis (SIL)
  8.8.1. SIL Analysis Methodology
  8.8.2. SIL Analysis Requirements
  8.8.3. SIL Analysis Execution
8.9. Plant Certification and CE Marking
  8.9.1. Need for Certification and CE Marking
  8.9.2. Authorized Certification Bodies
  8.9.3. Documentation
8.10. Permits and Approval: Case Study
  8.10.1. Technical Projects
  8.10.2. Environmental Documentation
  8.10.3. Certification

Module 9. Hydrogen Project Planning and Management

9.1. Scope Definition: Reference Projects
  9.1.1. Importance of Proper Scope Definition
  9.1.2. WBS (Work Breakdown Structure)
  9.1.3. Scope Management in Project Development
9.2. Characterization of Stakeholders and Entities in Hydrogen Project Management
  9.2.1. Need for Stakeholder Characterization
  9.2.2. Stakeholder Classification
  9.2.3. Stakeholder Management
9.3. Relevant Project Contracts in the Hydrogen Sector
  9.3.1. Classification of the Most Relevant Contracts
  9.3.2. Contracting Process
  9.3.3. Contract Content
9.4. Definition of Objectives and Impacts for Hydrogen Projects
  9.4.1. Objectives
  9.4.2. Impacts
  9.4.3. Objectives vs. Impacts
9.5. Work Plan in a Hydrogen Project
  9.5.1. Importance of the Work Plan
  9.5.2. Constituent Elements
  9.5.3. Development
9.6. Deliverables and Key Milestones in Hydrogen Projects
  9.6.1. Deliverables and Milestones. Defining Client Expectations
  9.6.2. Deliverables
  9.6.3. Milestones
9.7. Project Scheduling in Hydrogen Projects
  9.7.1. Preliminary Steps
  9.7.2. Definition of Activities. Timeline, PM Effort, and Stage Relationships
  9.7.3. Available Graphical Tools
9.8. Identification and Classification of Risks in Hydrogen Projects
  9.8.1. Creation of the Project Risk Plan
  9.8.2. Risk Analysis
  9.8.3. Importance of Project Risk Management
9.9. Analysis of the EPC Phase of a Reference Hydrogen Project
  9.9.1. Detailed Engineering
  9.9.2. Procurement and Supply
  9.9.3. Construction Phase
9.10. Analysis of the O&M Phase of a Hydrogen Type Project
  9.10.1. Development of the Operation and Maintenance Plan
  9.10.2. Maintenance Protocols. Importance of Preventive Maintenance
  9.10.3. Management of the Operation and Maintenance Plan

Module 10. Technical-Economic Analysis and Feasibility of Hydrogen Projects

10.1. Power Supply for Green Hydrogen
- 10.1.1. The Keys to PPAs (Power Purchase Agreement)
- 10.1.2. Self-Consumption with Green Hydrogen
- 10.1.3. Hydrogen Production in Off-Grid Configuration

10.2. Technical and Economic Modeling of Electrolysis Plants
- 10.2.1. Definition of Production Plant Requirements
- 10.2.2. CAPEX (Capital Expenditure)
- 10.2.3. OPEX (Operational Expenditure)

10.3. Technical and Economic Modeling of Storage Facilities according to Formats (GH2, LH2, Green Ammonia, Methanol, LOHC)
- 10.3.1. Technical Assessment of Different Storage Facilities
- 10.3.2. Cost Analysis
- 10.3.3. Selection Criteria

10.4. Technical and Economic Modeling of Transportation, Distribution, and End-Use Assets
- 10.4.1. Evaluation of Transportation and Distribution Costs
- 10.4.2. Technical Limitations of Current Hydrogen Transportation and Distribution Methods
- 10.4.3. Selection Criteria

10.5. Structuring of Hydrogen Projects. Financing Alternatives
- 10.5.1. Key Factors in Choosing Financing
- 10.5.2. Private Equity Financing
- 10.5.3. Public Financing

10.6. Identification and Characterization of Project Revenues and Costs
- 10.6.1. Revenues
- 10.6.2. Costs
- 10.6.3. Joint Evaluation

10.7. Cash Flow Calculation and Project Profitability Indicators (IRR, NPV, Others)
- 10.7.1. Cash Flow
- 10.7.2. Profitability Indicators
- 10.7.3. Practical Case

10.8. Feasibility and Scenario Analysis
- 10.8.1. Scenario Design
- 10.8.2. Scenario Analysis
- 10.8.3. Scenario Evaluation

10.9. Use Case Based on Project Finance
- 10.9.1. Relevant Roles of the SPV (Special Purpose Vehicle)
- 10.9.2. Development Process
- 10.9.3. Conclusions

10.10. Assessment of Barriers to Project Feasibility and Future Outlook
- 10.10.1. Existing Barriers to Hydrogen Project Feasibility
- 10.10.2. Assessment of the Current Situation
- 10.10.3. Future Prospects

Explore alkaline, PEM, and high-temperature electrolysis in depth in this university program"

04

Teaching Objectives

This academic program at TECH is designed to provide engineers with the tools needed to understand, design, and lead projects involving the use of hydrogen as an energy vector. Through a comprehensive approach, this degree spans everything from production via electrolysis to final storage and distribution in industrial sectors, including techno-economic analysis, current regulations, and project management. Accordingly, the learning objectives of this Professional Master's Degree ensure that graduates develop advanced technical competencies, drive the energy transition, and contribute meaningfully to consolidating the hydrogen economy.

Upon completing this program at TECH, you will be able to lead strategic projects involving hydrogen and position yourself as a key specialist in the development of clean technologies"

General Objectives

- Acquire a comprehensive understanding of hydrogen as an energy vector, including its role in the energy transition, its applications across various industrial sectors, and its potential for economy-wide decarbonization
- Master the key scientific and technological principles related to the production, storage, distribution, and utilization of hydrogen, including technologies such as electrolysis, fuel cells, and hybrid systems
- Analyze the regulatory, economic, and environmental framework that governs and conditions the development of hydrogen, assessing its technical and financial viability in diverse contexts
- Develop the skills to design, manage, and implement innovative projects based on hydrogen technologies, applying principles of sustainability, energy efficiency, and industrial safety

Master the design and optimization of the balance of plant for hydrogen production facilities"

Specific Objectives

Module 1. Hydrogen as an Energy Vector

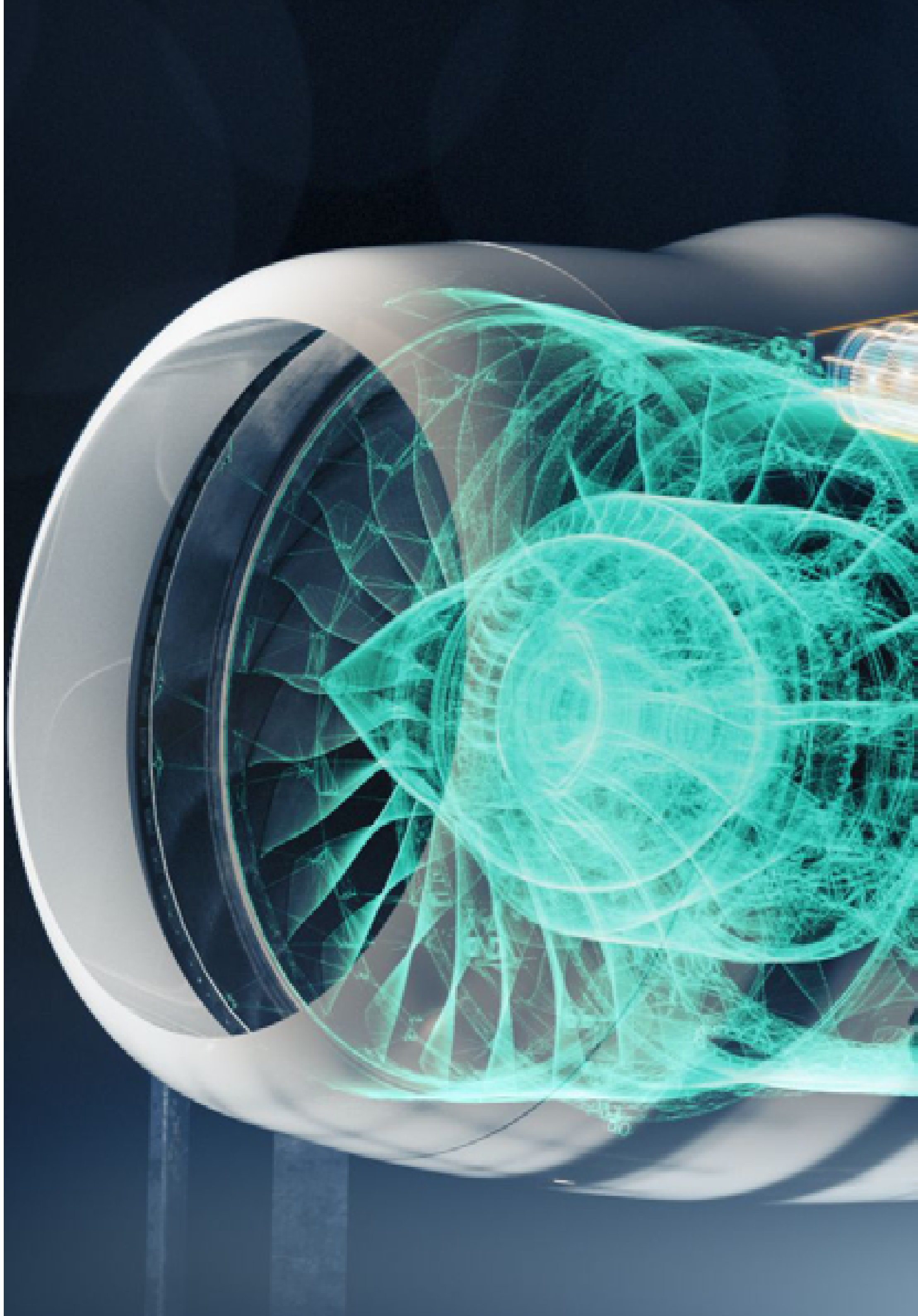
- Interpret in depth the unique features of the hydrogen environment
- Examine the existing legislative framework related to hydrogen
- Deepen knowledge of hydrogen as a molecule
- Identify the most relevant concepts in the hydrogen sector

Module 2. Hydrogen Production and Electrolysis

- Determine the methods of hydrogen production from fossil fuels
- Analyze the mechanisms for hydrogen generation from biomass
- Establish the modes of biological hydrogen production
- Differentiate the various electrolysis technologies for hydrogen generation

Module 3. Hydrogen Storage, Transportation and Distribution

- Develop knowledge of the different possibilities for hydrogen storage, transportation, and distribution
- Determine the main forms of hydrogen logistics across its value chain
- Analyze the possibilities and limitations of hydrogen export
- Deepen the techno-economic analysis of large-scale hydrogen logistics

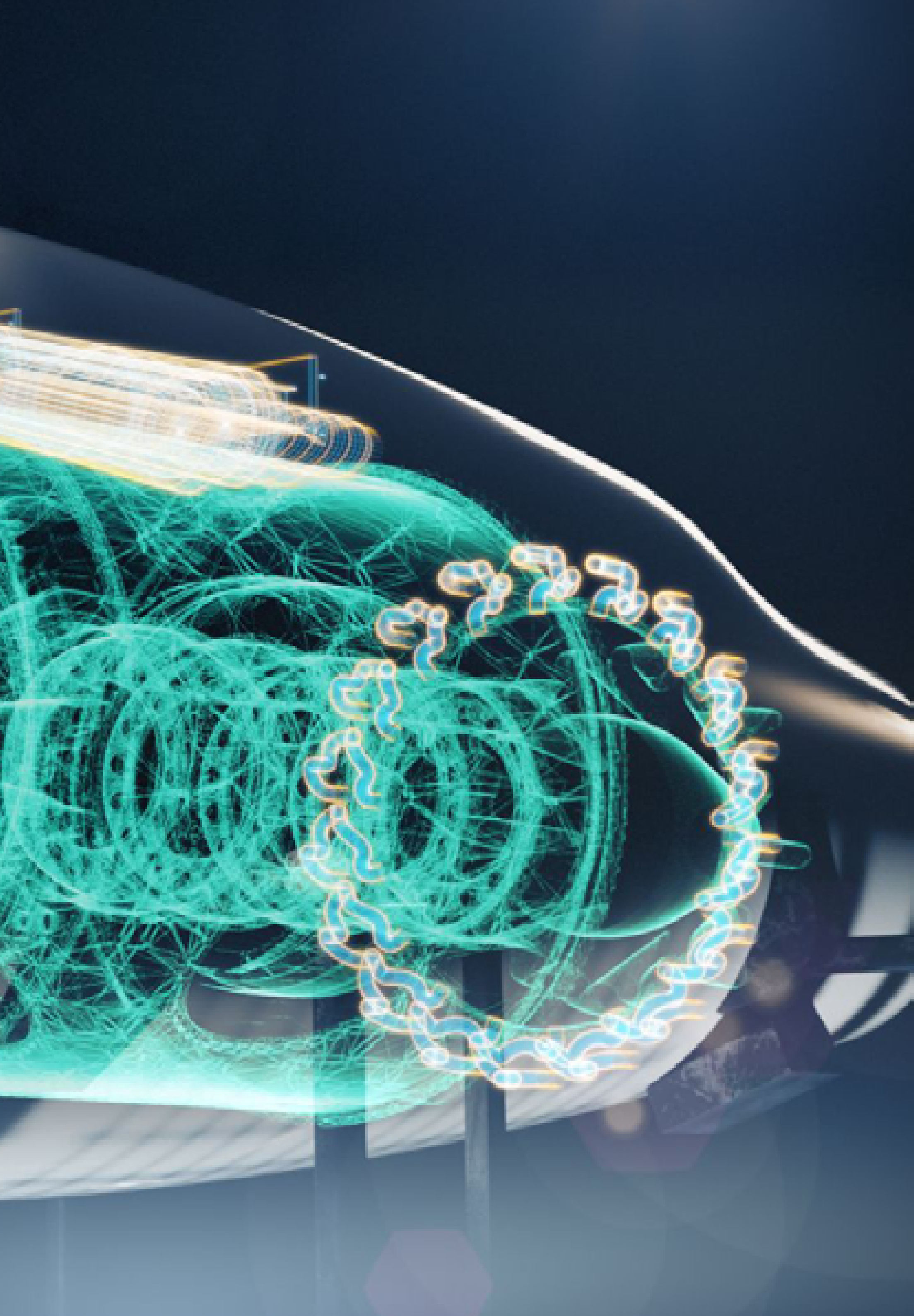


Module 4. Final Uses of Hydrogen
- Train students in the processes of e-fuel production
- Analyze the relationship between hydrogen and different industrial sectors
- Examine in depth the Haber-Bosch process and methanol production
- Determine the role of hydrogen in refineries and in steelmaking

Module 5. Hydrogen Fuel Cells
- Analyze the chemistry governing the operation of PEMFCs
- Train students in the design of the membrane-electrode assembly in PEMFCs
- Understand the functioning of the PEMFC fuel cell stack
- Analyze the characteristics of other types of fuel cells

Module 6. Hydrogen Refueling Stations
- Establish the different typologies of hydrogen refueling stations
- Understand the main design parameters
- Compile strategies for hydrogen storage at different pressure levels
- Analyze dispensing processes and their associated challenges

Module 7. Hydrogen Markets
- Assimilate the different markets where hydrogen can be deployed
- Understand the price bands for hydrogen according to its final uses
- Analyze the current demand and production of hydrogen
- Examine the expansion plans of hydrogen markets



Module 8. Regulatory and Safety Aspects of Hydrogen
- Deepen knowledge of best practices for the deployment of hydrogen projects
- Provide training on the documentation required by regulatory authorities
- Analyze the key applicable directives
- Study safety considerations for hydrogen facilities

Module 9. Hydrogen Project Planning and Management
- Compile the main project management tools
- Raise awareness of the importance of project risk identification and management

Module 10. Technical-Economic Analysis and Feasibility of Hydrogen Projects
- Develop specialized knowledge in the techno-economic and feasibility analysis of hydrogen projects
- Determine the structuring and financing of hydrogen projects
- Analyze the key aspects of power supply for green hydrogen production
- Learn to carry out feasibility analyses and evaluate different scenarios

05

Career Opportunities

The rise of hydrogen as an energy vector is redefining the global job market. This Professional Master's Degree provides access to a rapidly expanding sector, driven by ambitious decarbonization plans and significant public and private investment in clean technologies. Career opportunities are emerging in areas such as hydrogen systems engineering, energy transition consulting, sustainable mobility infrastructure design, and project management within energy and industrial companies. In addition, new pathways in research, innovation, and development are opening, supported by international funds and alliances focused on advancing green hydrogen.

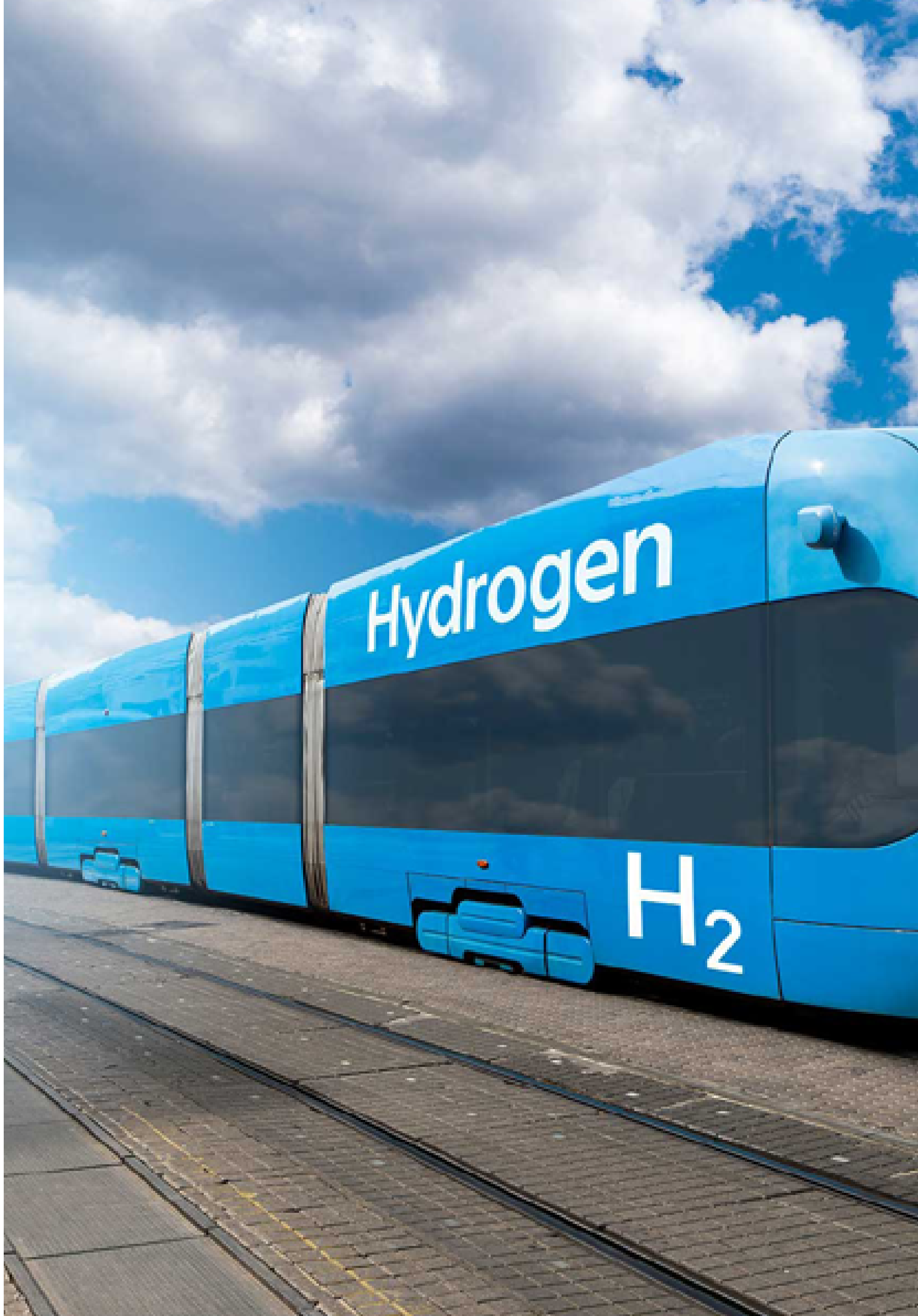
Graduates will apply advanced knowledge to real-world hydrogen projects, optimizing each stage of the value chain—from production to end use across strategic sectors"

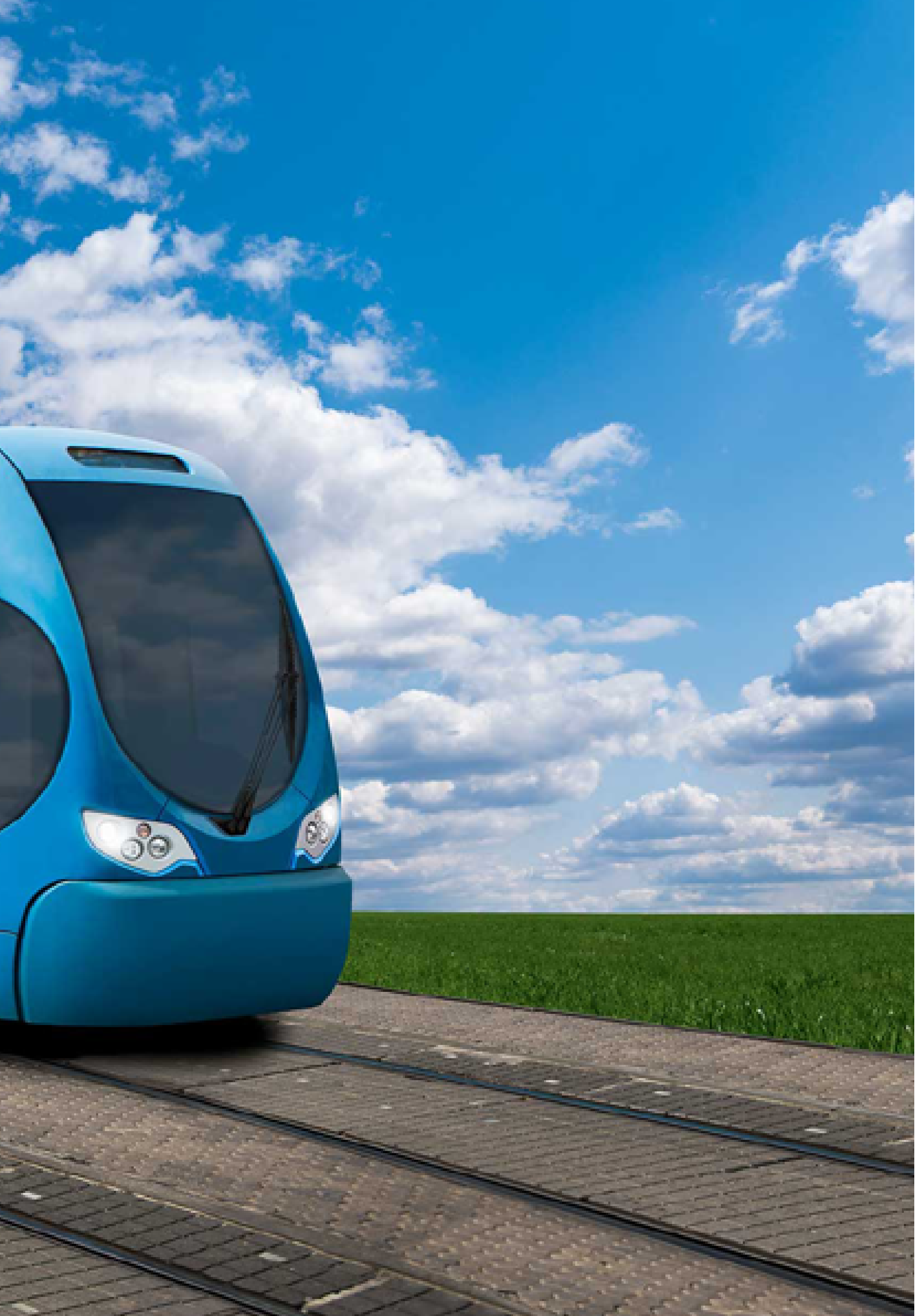
Graduate Profile

The graduate of this Professional Master's Degree at TECH will be a professional with solid technical, economic, and strategic preparation in the use of hydrogen as an energy vector. They will be equipped to analyze, design, implement, and manage projects involving hydrogen production, storage, distribution, and end-use applications, including electrolysis and fuel cell technologies. This specialist will be capable of interpreting international regulations, conducting techno-economic feasibility studies, and contributing to the development of infrastructures related to hydrogen in both industrial and sustainable mobility contexts.

Graduates will be well-prepared to work as engineers in energy transition projects, leading the development of hydrogen-based solutions in key sectors such as industry, transportation, and power generation.

- **Strategic and Financial Management:** Ability to structure hydrogen investment projects, apply project finance methodologies, and evaluate profitability, risks, and sustainability
- **Specialized Technical Knowledge:** Mastery of the hydrogen value chain, including production processes, storage and distribution systems, and integration in sectors such as industry, mobility, e-fuels production, and refineries
- **Regulation and Safety:** Competence in applying national and international regulations to hydrogen projects, ensuring safety, operational efficiency, and regulatory compliance
- **Leadership in Energy Innovation:** Capacity to lead technological initiatives related to decarbonization, acting as a key agent in the transition toward a hydrogen economy





After completing the university program, you will be able to apply your knowledge and skills in the following positions:

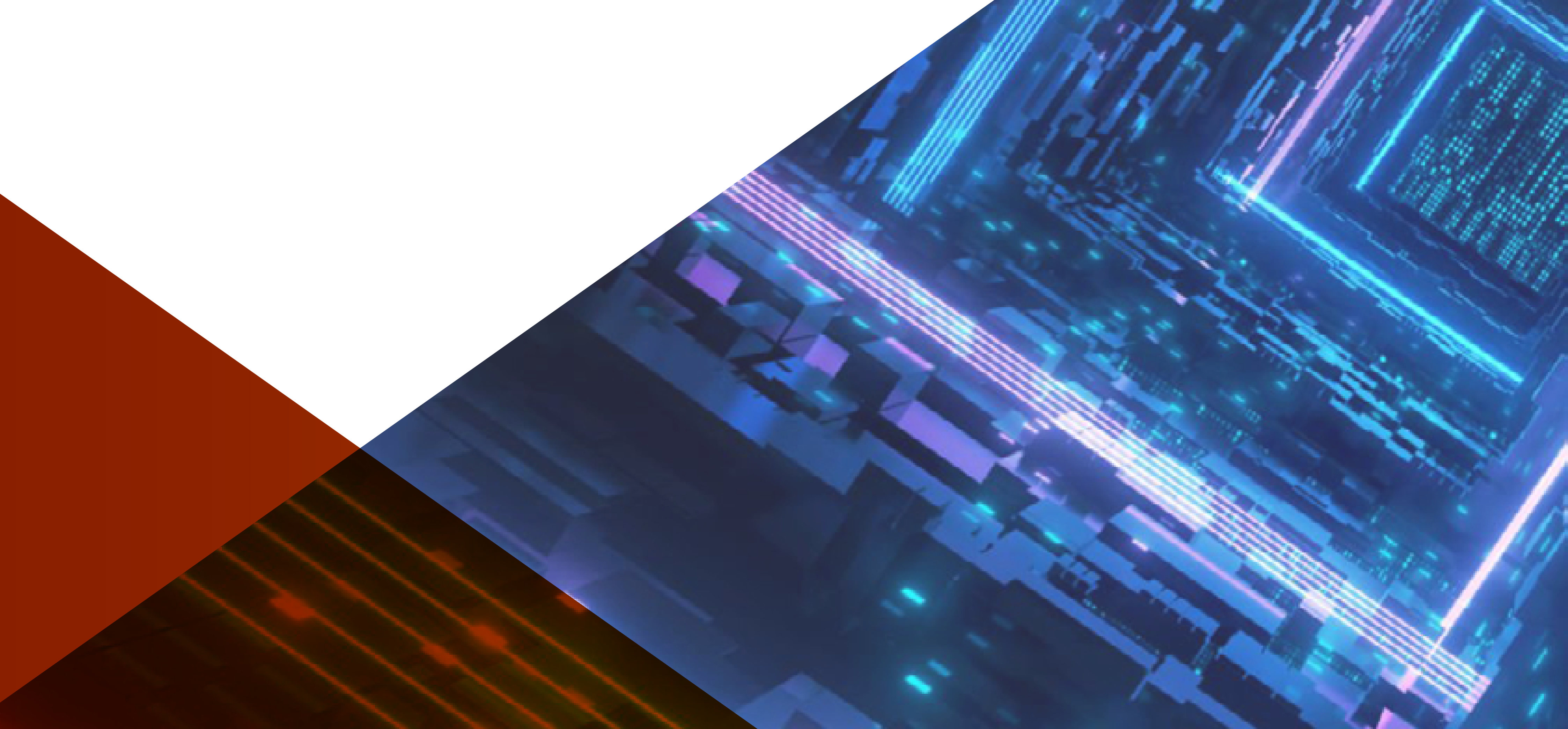
1. **Green Hydrogen Project Engineer:** Responsible for the design and implementation of hydrogen production plants through electrolysis, integrating renewable energy sources
2. **Energy Transition Consultant (Hydrogen Focus):** Strategic advisor supporting the incorporation of hydrogen solutions in industrial projects and sustainable mobility initiatives
3. **Fuel Cell Specialist:** Engineer or technician dedicated to the sizing, integration, and performance evaluation of energy generation systems based on fuel cells
4. **Hydrogen Infrastructure Manager:** Professional overseeing the development, operation, and maintenance of hydrogen refueling stations and distribution networks
5. **Hydrogen Project Feasibility Analyst:** Expert in financial structuring, profitability assessment, and scenario evaluation for hydrogen investment projects
6. **Hydrogen Safety and Regulatory Compliance Officer:** Specialist ensuring adherence to international regulations and best practices in the deployment of hydrogen infrastructures
7. **Renewable Energy Project Manager (Hydrogen Pathway):** Leader in the coordination and execution of complex projects aimed at decarbonization and the adoption of clean energy vectors
8. **Industrial Hydrogen Integration Specialist:** Professional promoting hydrogen applications in key industrial processes such as steel production, refineries, or chemical manufacturing

"You will analyze the oxidation-reduction reaction process and its relevance in hydrogen generation"

06

Software Licenses Included

TECH is a leading reference in the academic world for combining the latest technology with teaching methodologies to enhance the teaching-learning process. To achieve this, it has established a network of alliances that allows it to access the most advanced software tools used in the professional world.



Upon enrolling, you will receive, completely free of charge, academic credentials for the following professional software applications"

TECH has established a network of professional alliances with the leading providers of software applied to various professional fields. These alliances allow TECH to access hundreds of software applications and licenses, making them available to its students.

The academic software licenses will allow students to use the most advanced applications in their professional field, so they can become familiar with them and master their use without incurring additional costs. TECH will handle the hiring procedure so that students can use them unlimitedly during the time they are enrolled in the Professional Master's Degree in Hydrogen Technology, and they will be able to do so completely free of charge.

TECH will provide free access to the following software applications:

Ansys

Ansys is engineering simulation software that models physical phenomena such as fluids, structures, and electromagnetism. With a commercial value of **26,400 euros**, it is offered free of charge during the university program at TECH, providing access to cutting-edge technology for industrial design.

This platform excels in its ability to integrate multiphysics analysis into a single environment. It combines scientific precision with automation through APIs, streamlining the iteration of complex prototypes in industries such as aerospace or energy.

Key Features:

- **Integrated multiphysics simulation:** analyze structures, fluids, electromagnetism, and thermals in a single environment
- **Workbench:** a unified platform to manage simulations, automate processes, and customize workflows with Python
- **Discovery:** prototype in real-time with simulations accelerated by GPU
- **Automation:** create macros and scripts with APIs in Python, C++, and JavaScript
- **High Performance:** Solvers optimized for CPU/GPU and cloud scalability on demand

In conclusion, **Ansys** is the ultimate tool to transform ideas into technical solutions, offering power, flexibility, and an unparalleled simulation ecosystem.

Google Career Launchpad

Google Career Launchpad is a solution for developing digital skills in technology and data analysis. With an estimated value of **5,000 dollars**, it is included **for free** in TECH's university program, providing access to interactive labs and certifications recognized in the industry.

This platform combines technical training with practical cases, using technologies such as BigQuery and Google AI. It offers simulated environments to work with real data, along with a network of experts for personalized guidance.

Key Features:

- **Specialized Courses:** Updated content in cloud computing, machine learning, and data analysis
- **Live Labs:** Hands-on practice with real Google Cloud tools, no additional configuration required
- **Integrated Certifications:** Preparation for official exams with international validity
- **Professional Mentoring:** Sessions with Google experts and technology partners
- **Collaborative Projects:** Challenges based on real-world problems from leading companies

In conclusion, **Google Career Launchpad** connects users with the latest market technologies, facilitating their entry into fields such as artificial intelligence and data science with industry-backed credentials.

07

Study Methodology

TECH is the world's first university to combine the **case study** methodology with **Relearning**, a 100% online learning system based on guided repetition.

This disruptive pedagogical strategy has been conceived to offer professionals the opportunity to update their knowledge and develop their skills in an intensive and rigorous way. A learning model that places students at the center of the educational process giving them the leading role, adapting to their needs and leaving aside more conventional methodologies.

TECH will prepare you to face new challenges in uncertain environments and achieve success in your career"

The student: the priority of all TECH programs

In TECH's study methodology, the student is the main protagonist.
The teaching tools of each program have been selected taking into account the demands of time, availability and academic rigor that, today, not only students demand but also the most competitive positions in the market.

With TECH's asynchronous educational model, it is students who choose the time they dedicate to study, how they decide to establish their routines, and all this from the comfort of the electronic device of their choice. The student will not have to participate in live classes, which in many cases they will not be able to attend. The learning activities will be done when it is convenient for them. They can always decide when and from where they want to study.

At TECH you will NOT have live classes (which you might not be able to attend)"

The most comprehensive study plans at the international level

TECH is distinguished by offering the most complete academic itineraries on the university scene. This comprehensiveness is achieved through the creation of syllabi that not only cover the essential knowledge, but also the most recent innovations in each area.

By being constantly up to date, these programs allow students to keep up with market changes and acquire the skills most valued by employers. In this way, those who complete their studies at TECH receive a comprehensive education that provides them with a notable competitive advantage to further their careers.

And what's more, they will be able to do so from any device, pc, tablet or smartphone.

> *TECH's model is asynchronous, so it allows you to study with your pc, tablet or your smartphone wherever you want, whenever you want and for as long as you want"*

Case Studies and Case Method

The case method has been the learning system most used by the world's best business schools. Developed in 1912 so that law students would not only learn the law based on theoretical content, its function was also to present them with real complex situations. In this way, they could make informed decisions and value judgments about how to resolve them. In 1924, Harvard adopted it as a standard teaching method.

With this teaching model, it is students themselves who build their professional competence through strategies such as Learning by Doing or Design Thinking, used by other renowned institutions such as Yale or Stanford.

This action-oriented method will be applied throughout the entire academic itinerary that the student undertakes with TECH. Students will be confronted with multiple real-life situations and will have to integrate knowledge, research, discuss and defend their ideas and decisions. All this with the premise of answering the question of how they would act when facing specific events of complexity in their daily work.

Relearning Methodology

At TECH, case studies are enhanced with the best 100% online teaching method: Relearning.

This method breaks with traditional teaching techniques to put the student at the center of the equation, providing the best content in different formats. In this way, it manages to review and reiterate the key concepts of each subject and learn to apply them in a real context.

In the same line, and according to multiple scientific researches, reiteration is the best way to learn. For this reason, TECH offers between 8 and 16 repetitions of each key concept within the same lesson, presented in a different way, with the objective of ensuring that the knowledge is completely consolidated during the study process.

Relearning will allow you to learn with less effort and better performance, involving you more in your specialization, developing a critical mindset, defending arguments, and contrasting opinions: a direct equation to success.

A 100% online Virtual Campus with the best teaching resources

In order to apply its methodology effectively, TECH focuses on providing graduates with teaching materials in different formats: texts, interactive videos, illustrations and knowledge maps, among others. All of them are designed by qualified teachers who focus their work on combining real cases with the resolution of complex situations through simulation, the study of contexts applied to each professional career and learning based on repetition, through audios, presentations, animations, images, etc.

The latest scientific evidence in the field of Neuroscience points to the importance of taking into account the place and context where the content is accessed before starting a new learning process. Being able to adjust these variables in a personalized way helps people to remember and store knowledge in the hippocampus to retain it in the long term. This is a model called Neurocognitive context-dependent e-learning that is consciously applied in this university qualification.

In order to facilitate tutor-student contact as much as possible, you will have a wide range of communication possibilities, both in real time and delayed (internal messaging, telephone answering service, email contact with the technical secretary, chat and videoconferences).

Likewise, this very complete Virtual Campus will allow TECH students to organize their study schedules according to their personal availability or work obligations. In this way, they will have global control of the academic content and teaching tools, based on their fast-paced professional update.

> *The online study mode of this program will allow you to organize your time and learning pace, adapting it to your schedule”*

The effectiveness of the method is justified by four fundamental achievements:

1. Students who follow this method not only achieve the assimilation of concepts, but also a development of their mental capacity, through exercises that assess real situations and the application of knowledge.
2. Learning is solidly translated into practical skills that allow the student to better integrate into the real world.
3. Ideas and concepts are understood more efficiently, given that the example situations are based on real-life.
4. Students like to feel that the effort they put into their studies is worthwhile. This then translates into a greater interest in learning and more time dedicated to working on the course.

The university methodology top-rated by its students

The results of this innovative teaching model can be seen in the overall satisfaction levels of TECH graduates.

The students' assessment of the teaching quality, the quality of the materials, the structure of the program and its objectives is excellent. Not surprisingly, the institution became the top-rated university by its students according to the global score index, obtaining a 4.9 out of 5.

Access the study contents from any device with an Internet connection (computer, tablet, smartphone) thanks to the fact that TECH is at the forefront of technology and teaching.

You will be able to learn with the advantages that come with having access to simulated learning environments and the learning by observation approach, that is, Learning from an expert.

As such, the best educational materials, thoroughly prepared, will be available in this program:

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.

This content is then adapted in an audiovisual format that will create our way of working online, with the latest techniques that allow us to offer you high quality in all of the material that we provide you with.

Practicing Skills and Abilities

You will carry out activities to develop specific competencies and skills in each thematic field. Exercises and activities to acquire and develop the skills and abilities that a specialist needs to develop within the framework of the globalization we live in.

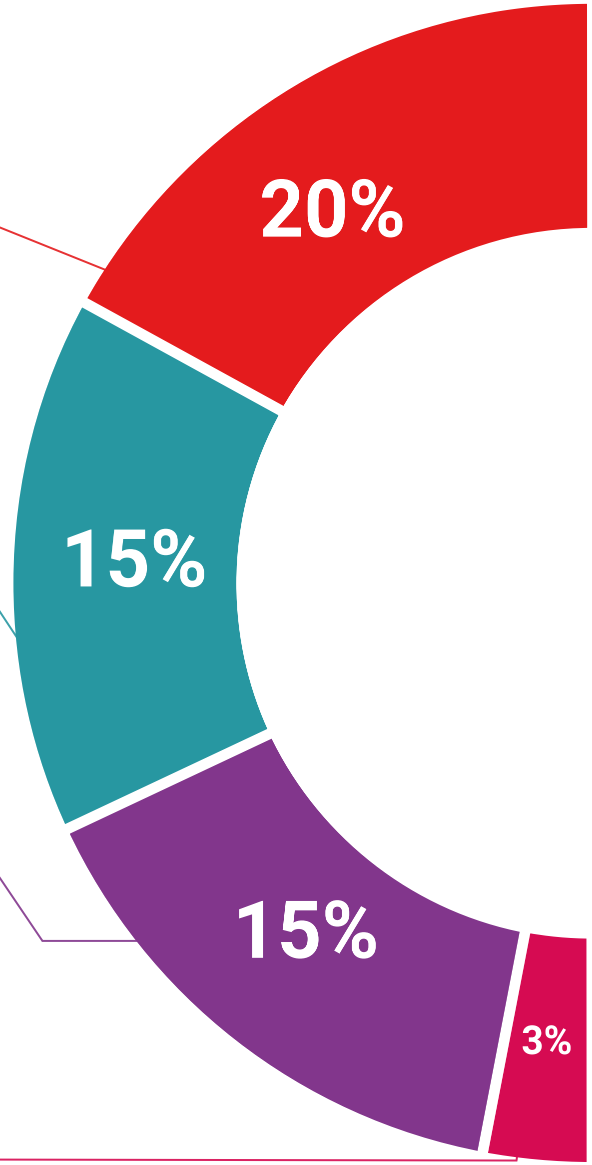
Interactive Summaries

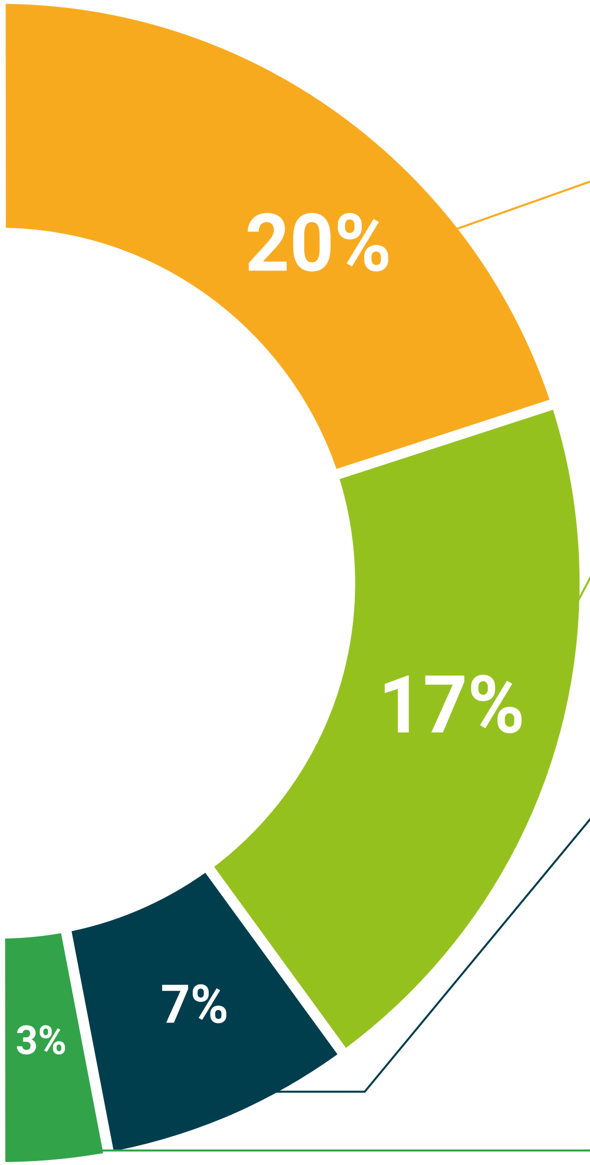
We present the contents attractively and dynamically in multimedia lessons that include audio, videos, images, diagrams, and concept maps in order to reinforce knowledge.

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

Additional Reading

Recent articles, consensus documents, international guides... In our virtual library you will have access to everything you need to complete your education.





Case Studies

Students will complete a selection of the best case studies in the field. Cases that are presented, analyzed, and supervised by the best specialists in the world.

Testing & Retesting

We periodically assess and re-assess your knowledge throughout the program. We do this on 3 of the 4 levels of Miller's Pyramid.

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 for future difficult decisions.

Quick Action Guides

TECH offers the most relevant contents of the course in the form of worksheets or quick action guides. A synthetic, practical and effective way to help students progress in their learning.

08
Teaching Staff

The philosophy of TECH is based on offering the most comprehensive and up-to-date university degrees within the academic landscape, which is why its teaching staff is selected with great care. For this Professional Master’s Degree, TECH has enlisted the expertise of leading specialists in the field of Hydrogen Technology. These professionals bring with them extensive career experience, having supported numerous companies in developing innovative solutions to strengthen their position in the market. In this way, students will enjoy an immersive learning experience that will enable them to achieve a significant leap forward in both their academic and professional development.

You will gain access to a curriculum designed by true leaders in the field of Hydrogen Technology"

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"

09

Certificate

The Professional Master's Degree in Hydrogen Technology guarantees students, in addition to the most rigorous and up-to-date education, access to a diploma for the Professional Master's Degree issued by TECH Global University.

Successfully complete this program and receive your university qualification without having to travel or fill out laborious paperwork"

This private qualification will allow you to obtain a **Professional Master's Degree in Hydrogen 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** 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.

TECH is a member of the **American Society for Engineering Education (ASEE)**, a society composed of leading international figures in engineering. This distinction strengthens its leadership in academic and technological development in engineering.

Accreditation/Membership

Title: **Professional Master's Degree in Hydrogen Technology**

Modality: **online**

Duration: **12 months**

Accreditation: **60 ECTS**

tech global university

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

Professional Master's Degree in Hydrogen Technology

This is a private qualification of 1,800 hours of duration equivalent to 60 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

Professional Master's Degree in Hydrogen Technology

General Structure of the Syllabus

Subject type	ECTS
Compulsory (CO)	60
Optional (OP)	0
External Work Placement (WP)	0
Master's Degree Thesis (MDT)	0
	Total 60

General Structure of the Syllabus

Year	Subject	ECTS	Type
1º	Hydrogen as an Energy Vector	6	CO
1º	Hydrogen Production and Electrolysis	6	CO
1º	Hydrogen Storage, Transportation and Distribution	6	CO
1º	Final Uses of Hydrogen	6	CO
1º	Hydrogen Fuel Cells	6	CO
1º	Hydrogen Refueling Stations	6	CO
1º	Hydrogen Markets	6	CO
1º	Regulatory and Safety Aspects of Hydrogen	6	CO
1º	Hydrogen Project Planning and Management	6	CO
1º	Technical-Economic Analysis and Feasibility of Hydrogen Projects	6	CO

Dr. Pedro Navarro Illana
Dean

tech global university

*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

Professional Master's Degree
Hydrogen Technology

- Modality: **online**
- Duration: **12 months**
- Certificate: **TECH Global University**
- Accreditation: **60 ECTS**
- Schedule: **at your own pace**
- Exams: **online**

Professional Master's Degree
Hydrogen Technology

Accreditation/Membership

ASEE American Society for Engineering Education

tech global university