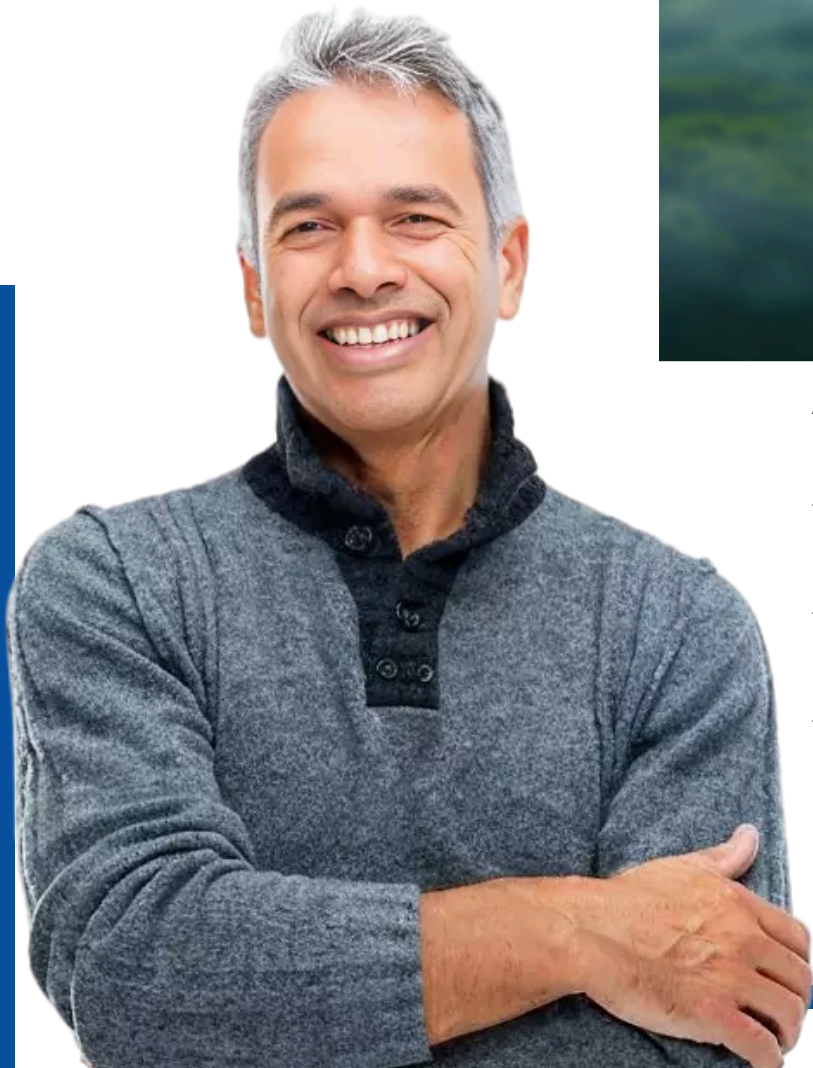




# ENGINEERS' CERTIFICATION PROGRAM

*Engineering Skills*



# Green Hydrogen Generating Station




At Electrical Learning Portal (ELP), we are dedicated to shaping the future of the electrical and MEP (Mechanical, Electrical, and Plumbing) industries through professional training and development. Our mission is to bridge the gap between the ever-evolving needs of employers and the dynamic skill set of engineers by providing comprehensive, industry-relevant education and training.

***Degree + Skills = Career Growth***

## CONTACT US

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# GREEN HYDROGEN GENERATING STATION

Welcome to the Electrical Learning Portal (ELP), a premier online institute! Our course on Green Hydrogen Generation Stations offers a timely and strategic opportunity for professionals aiming to lead the charge in the global energy transition. As nations across the world push forward with "Go Green" initiatives and decarbonization strategies, green hydrogen has become a cornerstone of sustainable development. This training program is designed to empower participants with the knowledge and skills required to thrive in this emerging and impactful field.

While the primary focus is on Green Hydrogen Production and Utilization, the course offers a comprehensive understanding of hydrogen's role in clean energy ecosystems. It explores the entire hydrogen value chain—from production technologies and equipment selection to logistics, certifications, and safety protocols—with a strong emphasis on real-world applications and project delivery.

Immerse yourself in the shift toward a low-carbon economy with a course that goes beyond theory to cover business strategies, financial modelling, and global market opportunities. Gain insights into how hydrogen is revolutionizing sectors like transportation, power, and heavy industry. Understand the technical, regulatory, and financial frameworks driving hydrogen projects worldwide.

Tailored for energy professionals, system designers, project planners, and engineers, the Green Hydrogen Generation Station course delivers an in-depth, industry-aligned learning experience. Join us to become a part of the hydrogen revolution and position yourself at the forefront of clean energy innovation!



# TOPICS

## 1. Introduction to Green Hydrogen

- *Global Energy Scenario & need for Hydrogen*
- *Comparison with grey, blue, and green hydrogen*
- *Why Green Hydrogen? Decarbonization and net-zero goals*
- *Role in energy transition and climate goals.*

## 2. Strategic Importance and Policy Drivers

- *Government incentives and subsidies (global focus).*
- *Energy security, export potential, and geopolitical implications.*
- *National hydrogen missions (India, EU, Australia, etc.).*
- *Industrial use cases and decarbonization pathways.*

## 3. Hydrogen Production Technologies

- *Overview of electrolysis (PEM, Alkaline, SOEC).*
- *Selection criteria for electrolyzer technology*
- *Integration with solar, wind, and BESS RES*
- *Efficiency and system layout options*

## 4. Equipment Selection and Sizing

- **Electrolyzer Sizing:** *Based on daily hydrogen demand, load profile, efficiency, and power input*
- **Solar/Wind System Sizing:** *Based on electrolyzer peak power needs + buffer*
- **Water Purification Units:** *Sizing based on hydrogen volume*
- **Hydrogen Storage:** *Buffer storage design (autonomy days, safety limits)*

- **Cooling Systems:** *Heat rejection sizing for stack and electronics*
- **Piping and Instrumentation:** *Material selection (SS316L, composites) and pressure classes*
- **Safety Systems:** *Gas detectors, relief valves, shutdown protocols*

## 5. Hydrogen Applications

- **Industrial:** *Ammonia, refineries, steel, methanol.*
- **Mobility:** *Hydrogen fuel cell vehicles, buses, trains.*
- **Power Sector:** *Grid balancing, seasonal storage.*
- **Residential:** *Blending in natural gas grids.*

## 6. Electrical System Design

- **Power System Design:**
  1. *SLDs (Single Line Diagrams) for the hydrogen plant.*
  2. *AC/DC bus design and integration with RE sources*
- **Cable Selection:**
  1. *LV/MV cable sizing for electrolysis units, safety margin, and derating factors.*
  2. *Use of fire-retardant, hydrogen-combustible sheathing*

- **Protection System Design:**

1. Circuit breakers, isolators, surge protectors
2. Fuse selection for electrolyzers and auxiliary loads

- **Lighting and Emergency Systems:**

1. Zone classification (hazardous area lighting)
2. Emergency lighting and battery banks

- **Grounding and Bonding:**

1. Earthing grids for hydrogen systems
2. Potential equalization and lightning protection

- **SCADA and Automation:**

1. System integration for monitoring and control
2. PLC/RTU-based automation

## 7. Hydrogen Logistics & Shipping

- **Compression and Bottling:** Pressure range selection
- **Storage Systems:** Mobile and fixed high-pressure storage
- **Transport & Shipping Methods:**
  1. Cylinders, tube trailers, and liquid hydrogen containers
  2. Maritime hydrogen/ammonia shipping (ISO tanks, LOHC)
- **Export Regulations:** Compliance with global transport standards (ADR, IMDG)
- **Safety in Transport:** Leak detection, ventilation, and emergency response

## 8. Standards and Certifications

- ISO 14687, ISO 19880 for hydrogen production and handling.
- **Green Hydrogen Certification:**
  1. Carbon intensity, traceability, and compliance.
  2. The European RFNBO requirements and India's Green H2 mission.

## 9. Safety Design & Risk Management

- Hydrogen-specific hazards and risk mitigation.
- Zoning, gas detection, flameproofing.
- Safety case preparation and regulatory approvals.

## 10. Financial Modeling & Project Planning

- CAPEX/OPEX estimates, cost breakdown of systems.
- LCOH calculation and sensitivity analysis.
- Revenue streams: carbon credits, export, mobility.
- Business models and tender preparation.

## 11. Case Studies & Practical Applications





### ***Benefits of the program***

1. *Join the professional training*
2. *Understand the real world*
3. *Be a part of the Professional Engineers' Community*
4. **Program Completion Certificates**
5. **Join our engineers' WhatsApp Groups**

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