Electrolysis and Hydrogen Technologies Training Course

Professional Development Training Course Outline

Category	General Training	**Duration**	5 Days
Base Fee	$1,500 USD	**Delivery Mode**	Online / On-site Hybrid

Course Introduction

The global transition toward Net-Zero Emissions, Clean Energy Transformation, and Decarbonization Strategies has accelerated the deployment of Green Hydrogen Technologies as a critical pillar of the future energy ecosystem. Hydrogen produced through Water Electrolysis using renewable energy sources offers a sustainable pathway for reducing carbon emissions across power generation, transportation, industrial manufacturing, chemical processing, and energy storage applications. As governments and industries invest heavily in Hydrogen Economy Development, there is an increasing demand for professionals equipped with advanced knowledge of electrolysis systems, hydrogen production technologies, safety standards, and commercial deployment strategies.

Electrolysis and Hydrogen Technologies Training Course provides participants with practical and theoretical expertise in PEM Electrolysis, Alkaline Electrolysis, Solid Oxide Electrolysis, Hydrogen Storage Systems, Fuel Cell Technologies, Power-to-X Solutions, and Renewable Energy Integration. The program explores emerging innovations, global market trends, policy frameworks, investment opportunities, and real-world industrial applications. Through case studies, simulations, and hands-on learning, participants will develop the competencies required to support large-scale hydrogen projects and contribute to the rapidly growing clean energy sector.

Programme Curriculum

Electrolysis and Hydrogen Technologies Training Course

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Course Duration

5 days

Course Objectives

Upon completion of the course, participants will be able to:

1. Understand the fundamentals of the Hydrogen Economy and global energy transition.
2. Explain principles of Water Electrolysis Technology and hydrogen generation processes.
3. Compare PEM, Alkaline, and Solid Oxide Electrolyzers.
4. Evaluate Green Hydrogen Production pathways and sustainability metrics.
5. Assess Renewable Energy Integration with hydrogen production systems.
6. Analyze Hydrogen Storage and Transportation Technologies.
7. Implement international Hydrogen Safety and Risk Management standards.
8. Design efficient Power-to-X and Sector Coupling Solutions.
9. Examine emerging Hydrogen Infrastructure Development strategies.
10. Evaluate economic feasibility using Hydrogen Project Finance Models.
11. Apply Digitalization, AI, and Smart Monitoring in hydrogen facilities.
12. Understand regulatory frameworks, ESG compliance, and carbon reduction targets.
13. Develop practical skills for hydrogen project planning, operation, and optimization.

Target Audience

1. Energy Engineers and Renewable Energy Specialists
2. Chemical and Process Engineers
3. Power Plant Operators and Technicians
4. Hydrogen Project Managers
5. Sustainability and ESG Professionals
6. Government Energy Policymakers and Regulators
7. Researchers, Academics, and University Faculty
8. Investors, Consultants, and Business Development Professionals

Course Modules

Module 1: Hydrogen Economy and Energy Transition

- Global hydrogen market outlook and trends

- Net-zero pathways and decarbonization strategies
- Hydrogen value chain overview
- International hydrogen roadmaps and policies
- Green, blue, grey, and turquoise hydrogen comparison
- **Case Study:** European Union Hydrogen Strategy and large-scale hydrogen deployment initiatives.

Module 2: Fundamentals of Electrolysis Technologies

- Principles of electrochemical water splitting
- Electrolyzer components and operation
- Alkaline electrolysis systems
- PEM electrolysis technologies
- Solid oxide electrolysis systems
- **Case Study:** Commercial deployment of PEM electrolyzers in renewable energy projects.

Module 3: Renewable Energy Integration for Green Hydrogen

- Solar-powered hydrogen production
- Wind-to-hydrogen systems
- Hybrid renewable energy configurations
- Grid balancing and energy management
- Power-to-Hydrogen optimization techniques
- **Case Study:** Utility-scale green hydrogen production using offshore wind farms.

Module 4: Hydrogen Storage and Transportation

- Compressed hydrogen storage
- Liquid hydrogen technologies
- Hydrogen carriers and ammonia pathways
- Pipeline transportation systems
- Distribution and logistics infrastructure
- **Case Study:** International hydrogen export projects utilizing ammonia as a carrier.

Module 5: Fuel Cells and Hydrogen Applications

- Fuel cell fundamentals
- PEM fuel cells and industrial applications
- Hydrogen mobility and transportation
- Industrial decarbonization opportunities
- Hydrogen for power generation
- **Case Study:** Hydrogen-powered public transportation systems and fuel cell bus networks.

Module 6: Hydrogen Safety, Standards, and Risk Management

- Hydrogen properties and hazards
- Risk assessment methodologies
- Safety regulations and international standards
- Emergency response planning
- Operational safety management systems
- **Case Study:** Safety management practices in hydrogen refueling stations.

Module 7: Economics, Policy, and Investment in Hydrogen Projects

- Hydrogen project economics
- Cost reduction pathways
- Carbon markets and incentives
- Financing and investment models
- Policy frameworks and regulatory compliance
- **Case Study:** Economic assessment of green hydrogen production versus conventional fuels.

Module 8: Emerging Technologies and Future Hydrogen Innovations

- Artificial Intelligence in hydrogen operations
- Digital twins and predictive maintenance
- Advanced electrolyzer materials
- Carbon-neutral industrial ecosystems
- Future hydrogen market opportunities
- **Case Study:** AI-enabled smart hydrogen production plants and digital energy ecosystems.

Training Methodology

This course employs a participatory and hands-on approach to ensure practical learning, including:

- Interactive lectures and presentations.
- Group discussions and brainstorming sessions.
- Hands-on exercises using real-world datasets.
- Role-playing and scenario-based simulations.
- Analysis of case studies to bridge theory and practice.
- Peer-to-peer learning and networking.
- Expert-led Q&A sessions.
- Continuous feedback and personalized guidance.

Register as a group from 3 participants for a Discount

Send us an email: info@fineskilltrainingcenter.org or call *+254769199797*

Certification

Upon successful completion of this training, participants will be issued with a globally- recognized certificate.

Tailor-Made Course

We also offer tailor-made courses based on your needs.

Key Notes

a. The participant must be conversant with English.

b. Upon completion of training the participant will be issued with an Authorized Training Certificate

c. Course duration is flexible and the contents can be modified to fit any number of days.

d. The course fee includes facilitation training materials, 2 coffee breaks, buffet lunch and A Certificate upon successful completion of Training.

e. One-year post-training support Consultation and Coaching provided after the course.

f. Payment should be done at least a week before commence of the training, to Fineskill Training Center account, as indicated in the invoice so as to enable us prepare better for you.

Upcoming Scheduled Sessions

Start Date	End Date	Location	Price
23 Nov 2026	27 Nov 2026	Online	$1,000
23 Nov 2026	27 Nov 2026	Physical	$1,500
23 Nov 2026	27 Nov 2026	Physical	$3,000
23 Nov 2026	27 Nov 2026	Physical	$3,000
23 Nov 2026	27 Nov 2026	Physical	$6,000
23 Nov 2026	27 Nov 2026	Physical	$4,500
23 Nov 2026	27 Nov 2026	Physical	$6,000
23 Nov 2026	27 Nov 2026	Physical	$6,000

Ready to enroll or request a customized program? Book online or contact us:

Register Online Now

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