Offshore Renewable Energy Systems Training Course

Professional Development Training Course Outline

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

Course Introduction

Offshore Renewable Energy Systems Training Course provides a comprehensive, industry-focused foundation in the rapidly evolving field of offshore wind energy, floating offshore wind, marine renewable energy, smart grids, energy storage, green hydrogen, and digital energy systems. Offshore renewable projects are becoming increasingly important to global energy transition strategies, while the sector continues to face challenges involving grid integration, supply-chain resilience, permitting, project bankability, infrastructure, and environmental sustainability. Current industry priorities also include advanced floating foundations, HVDC transmission, digitalisation, predictive maintenance, and system flexibility.

This course develops practical and strategic capabilities across the complete offshore renewable energy value chain from resource assessment, technology selection, offshore wind farm design, foundations and subsea cables to operations and maintenance, energy storage, power-to-X, green hydrogen, environmental management, and project economics. Participants will explore real-world case studies, project scenarios, risk-management frameworks, digital tools, and emerging technologies, enabling them to evaluate offshore renewable projects from both engineering and business perspectives. The programme also addresses the growing importance of floating offshore wind, interoperable grids, HVDC networks, marine spatial planning, workforce development, and sustainable coexistence with fisheries and other maritime activities.

Programme Curriculum

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Course Objectives

By the end of the course, participants will be able to:

1. Explain the offshore renewable energy ecosystem and its role in the global energy transition.
2. Evaluate offshore wind resource assessment, metocean data, site conditions, and energy yield.
3. Compare fixed-bottom and floating offshore wind technologies, including emerging platform concepts.
4. Assess turbine, foundation, mooring, anchoring, and subsea cable technologies.
5. Apply principles of offshore electrical systems, HVDC transmission, grid integration, and power quality.
6. Examine digitalisation, AI-enabled analytics, digital twins, IoT, and predictive maintenance for offshore assets.
7. Evaluate energy storage, demand flexibility, hybrid renewable systems, and power-system resilience.
8. Analyse opportunities for coupling offshore renewables with green hydrogen, e-fuels, and Power-to-X systems.
9. Apply marine spatial planning, environmental impact assessment, biodiversity protection, and sustainable development principles.
10. Identify major HSE, operational, weather, marine, technical, and project risks.
11. Assess CAPEX, OPEX, LCOE, bankability, financing structures, auctions, and revenue mechanisms.
12. Develop strategies for supply-chain optimisation, port infrastructure, installation logistics, and workforce readiness.
13. Formulate integrated strategies for net-zero offshore energy projects, climate resilience, and long-term asset performance.

Target Audience

1. Renewable Energy Engineers and electrical/mechanical engineers
2. Offshore Wind Project Developers and project managers
3. Energy and Utilities Professionals
4. Marine, Ocean, and Offshore Engineering Specialists
5. Grid, Transmission, and Power-System Professionals
6. Government, Regulators, and Energy Policy Professionals
7. Investors, Financial Analysts, and Infrastructure Consultants

8. Researchers, Academics, Sustainability Professionals, and Technical Leaders

Course Modules

Module 1: Offshore Renewable Energy Landscape and Technology Trends

- Global offshore renewable energy markets, deployment drivers, and **net-zero pathways**.
- Offshore wind, floating wind, wave, tidal, and hybrid renewable energy technologies.
- **Energy transition**, decarbonisation, energy security, and offshore industrial ecosystems.
- Emerging markets, investment trends, policy frameworks, and **project bankability**.
- **Case Study:** Global offshore wind development and lessons from mature European markets.

Module 2: Offshore Wind Resource Assessment and Site Development

- **Wind resource assessment**, metocean conditions, wake effects, and energy yield estimation.
- Geophysical, geotechnical, bathymetric, and seabed investigations.
- Site selection, **marine spatial planning**, exclusion zones, and environmental constraints.
- Turbine layout optimisation and pre-construction engineering.
- **Case Study:** Site-selection strategy for a hypothetical offshore wind farm using resource, seabed, grid, and environmental criteria.

Module 3: Turbines, Foundations, Floating Wind and Marine Structures

- Offshore turbine architecture, large-scale turbines, controls, and performance.
- Fixed-bottom foundations
- Floating offshore wind: **spar, semi-submersible, and tension-leg platforms**.
- Mooring, anchoring, dynamic cables, stability, hydrodynamics, and extreme-weather design.
- **Case Study:** Floating offshore wind deployment in deeper waters and the engineering trade-offs between platform concepts.

Module 4: Offshore Electrical Systems, HVDC and Grid Integration

- Inter-array and export cable systems, substations, transformers, and power electronics.
- **HVAC vs HVDC**, converter platforms, transmission losses, and long-distance export.
- Grid codes, voltage control, frequency support, ancillary services, and system stability.
- Offshore grid expansion, **hybrid interconnectors, meshed grids, and interoperable infrastructure**.
- **Case Study:** Designing an offshore transmission strategy for a large-scale wind cluster connected to multiple markets.

Module 5: Digitalisation, AI, Digital Twins and Predictive Maintenance

- **AI, machine learning, IoT, sensors, SCADA, and big-data analytics** for offshore assets.
- Digital twins for turbine, foundation, cable, and offshore-farm performance monitoring.
- Condition monitoring, anomaly detection, **predictive maintenance**, and failure forecasting.
- Remote operations, autonomous inspection, robotics, drones, and data-driven decision-making.
- **Case Study:** Predictive-maintenance programme using operational data to reduce unplanned offshore turbine downtime.

Module 6: Energy Storage, Hybrid Systems and Green Hydrogen

- Battery energy storage and its role in **renewable integration and grid flexibility**.
- Offshore wind combined with solar, storage, interconnectors, and flexible demand.

- **Green hydrogen**, offshore electrolysis, hydrogen transport, and Power-to-X.
- E-fuels, renewable ammonia, industrial decarbonisation, and integrated energy hubs.
- **Case Study:** Floating offshore wind coupled with green hydrogen production and assessment of infrastructure requirements.

Module 7: Environmental Sustainability, HSE and Stakeholder Management

- **Environmental impact assessment**, marine biodiversity, noise, seabed impacts, and monitoring.
- Fisheries, shipping, conservation, coastal communities, and **stakeholder engagement**.
- Offshore HSE management, emergency preparedness, marine operations, and occupational safety.
- Climate resilience, lifecycle sustainability, circular economy, recycling, and decommissioning.
- **Case Study:** Developing a stakeholder and environmental-management framework for a proposed offshore wind development.

Module 8: Project Economics, Finance, Construction and Future Offshore Energy

- **CAPEX, OPEX, LCOE, NPV, IRR, sensitivity analysis, and project bankability**.
- Procurement, contracts, auctions, CfDs, insurance, financing, and investment risk.
- Ports, vessels, installation logistics, supply chains, manufacturing, and workforce development.
- Operations and maintenance, life extension, repowering, decommissioning, and circularity.
- **Case Study:** Investment and delivery strategy for a utility-scale offshore renewable project, incorporating financing risk, grid connection, supply-chain constraints, and lifecycle economics.

Training Methodology

- 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

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