Offshore Wind Farm Development 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 Wind Farm Development Training Course provides a practical, project-focused foundation for professionals involved in the planning, development, financing, engineering, construction, and operation of offshore renewable energy projects. The program covers the complete offshore wind project lifecycle, from wind-resource assessment and site selection through marine spatial planning, environmental impact assessment, permitting, geotechnical investigation, turbine selection, foundation design, subsea cabling, grid integration, construction, commissioning, operations and maintenance (O&M), and decommissioning. Particular emphasis is placed on emerging industry priorities including floating offshore wind, large-scale turbines, HVDC transmission, energy storage, digital twins, AI-enabled predictive maintenance, remote monitoring, robotics, ESG, biodiversity protection, and supply-chain resilience. Current industry developments increasingly highlight digital twins for siting, wake modelling, turbine monitoring, extreme-weather assessment, and grid planning, making digitalization an important component of modern offshore wind development.

Participants will learn how to transform an offshore wind concept into a technically feasible, environmentally responsible, financially viable, and investment-ready project. Through real-world case studies, project simulations, technical workshops, group exercises, risk assessments, and development scenarios, learners will examine the challenges associated with deepwater sites, metocean conditions, marine logistics, stakeholder engagement, regulatory compliance, power evacuation, construction interfaces, and long-term asset performance. The course also explores how AI, IoT, digital twins, predictive analytics, autonomous inspection, and data-driven asset management are reshaping offshore wind O&M and lifecycle optimization. Recent research and industry activity demonstrate growing interest in digital-twin applications for wind-farm planning, turbine health monitoring, predictive maintenance, and floating-wind systems.

Programme Curriculum

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Course Duration

5 days

Course Objectives

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

1. Understand the offshore wind project lifecycle, market dynamics, technologies, and development pathways.
2. Conduct offshore wind resource assessment using metocean, remote-sensing, and site-characterization data.
3. Apply marine spatial planning and GIS-based site selection for optimized wind-farm development.
4. Evaluate fixed-bottom and floating offshore wind technologies, foundations, mooring systems, and turbine configurations.
5. Develop preliminary wind-farm layouts, wake-loss strategies, energy-yield assessments, and optimization models.
6. Understand geotechnical, geophysical, metocean, and environmental investigations required for bankable projects.
7. Apply environmental impact assessment, biodiversity management, ESG, stakeholder engagement, and marine consenting principles.
8. Evaluate subsea cable systems, offshore substations, export transmission, HVDC, and grid-integration requirements.
9. Understand marine logistics, installation engineering, ports, vessels, construction sequencing, commissioning, and project interfaces.

10. Apply project finance, CAPEX/OPEX analysis, LCOE, procurement strategies, contracts, and investment-risk management.
11. Develop robust HSE, marine safety, emergency-response, weather-risk, and operational risk-management approaches.
12. Apply AI, IoT, SCADA, digital twins, predictive analytics, drones, robotics, and remote monitoring to offshore wind assets.
13. Evaluate lifecycle O&M, asset performance, repowering, decommissioning, circular economy, and future offshore wind opportunities.

Target Audience

1. Offshore wind project developers and renewable-energy professionals
2. Energy and power-sector engineers
3. Marine, offshore, civil, structural, and geotechnical engineers
4. Environmental, ESG, biodiversity, and sustainability professionals
5. Utilities, grid operators, and transmission specialists
6. Government officials, regulators, planners, and policymakers
7. Project managers, consultants, investors, financiers, and procurement professionals
8. Researchers, academics, GIS specialists, and energy-technology professionals

Course Modules

Module 1: Offshore Wind Market, Technology & Project Lifecycle

- Global **offshore wind market trends**, development drivers, and investment opportunities
- Offshore wind project lifecycle from **concept to decommissioning**
- Fixed-bottom versus **floating offshore wind** technologies
- Large-scale turbines, offshore substations, and next-generation project architectures
- **Case Study:** Lessons from the development of major European offshore wind projects

Module 2: Wind Resource Assessment, Site Selection & Marine Spatial Planning

- Offshore **wind-resource assessment**, metocean data, LiDAR, and measurement campaigns
- Bathymetry, seabed conditions, geological and geophysical investigations
- **GIS-based site screening**, spatial constraints, and multi-criteria analysis
- Wake effects, energy yield, turbine spacing, and preliminary farm optimization
- **Case Study:** Digital-twin-enabled offshore wind siting and wake assessment, reflecting current DTWO development work.

Module 3: Environmental, Regulatory, ESG & Stakeholder Management

- **Environmental Impact Assessment (EIA)** and marine environmental baseline studies
- Marine biodiversity, fisheries, seabirds, marine mammals, and habitat considerations
- Offshore leasing, consenting, permitting, maritime regulations, and compliance
- **ESG**, social value, community engagement, and stakeholder-management strategies
- **Case Study:** Regulatory and environmental planning approaches used in established offshore wind markets

Module 4: Engineering Design, Foundations, Floating Wind & Electrical Systems

- Turbine technology, structural design, monopiles, jackets, and alternative foundations
- **Floating wind platforms**, anchors, mooring systems, and dynamic subsea cables

- Offshore substations, array cables, export cables, and electrical architecture
- **HVAC/HVDC transmission**, grid connection, power quality, and system stability
- **Case Study:** Deepwater floating-wind digital-twin and shared-mooring optimization, including research demonstrating potential anchor-reduction benefits.

Module 5: Construction, Marine Logistics, Installation & HSE

- Offshore construction strategy, installation sequencing, and marine coordination
- Ports, heavy-lift vessels, cable-laying vessels, installation vessels, and logistics
- Weather windows, metocean constraints, marine operations, and schedule optimization
- **HSE**, risk assessment, emergency response, and construction-interface management
- **Case Study:** Offshore installation planning and marine logistics for large-scale wind-farm construction

Module 6: Project Finance, Procurement, Contracts & Risk Management

- **CAPEX, OPEX, LCOE, NPV, IRR**, financial modelling, and investment evaluation
- Project-finance structures, bankability, revenue models, and financial risk
- Procurement strategies, competitive tendering, EPC/EPCI, and supply-chain management
- Contractual risk allocation, cost escalation, schedule risk, and contingency planning
- **Case Study:** Financial and procurement risk assessment for a utility-scale offshore wind development

Module 7: Digitalization, AI, Digital Twins & Smart O&M

- **SCADA, IoT sensors, cloud platforms, AI, machine learning, and predictive analytics**
- Digital twins for turbine monitoring, farm optimization, weather and extreme-event analysis
- Drone, robotic, autonomous, and remote inspection technologies
- Predictive maintenance, condition monitoring, reliability engineering, and downtime reduction
- **Case Study:** Kincardine floating wind digital twin and its application to asset-management challenges.

Module 8: Grid Integration, Lifecycle Management & Future Offshore Wind

- Grid integration, offshore transmission, **HVDC, energy storage, and hybrid systems**
- Asset performance management, reliability, availability, and lifecycle optimization
- Repowering, decommissioning, recycling, circular economy, and end-of-life planning
- Emerging opportunities in **floating wind, Power-to-X, green hydrogen, AI, and autonomous offshore systems**
- **Case Study:** Digital-twin applications for wind-farm planning, operations, turbine monitoring, and grid-energy-system integration.

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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