Wind Farm Asset Management 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

Wind Farm Asset Management Training Course is designed to equip energy professionals with practical, future-focused capabilities for managing the performance, reliability, lifecycle value, and operational risks of modern wind energy assets. The program integrates wind turbine asset management, predictive maintenance, condition monitoring, SCADA analytics, digital twins, artificial intelligence (AI), machine learning, remaining useful life (RUL), reliability engineering, performance optimization, and lifecycle cost management. These technologies are increasingly shaping wind-farm O&M strategies, with recent industry research highlighting digital twins, predictive analytics, prognostics, and closed-loop decision-making as important directions for next-generation wind asset management.

Participants will learn how to move from reactive maintenance toward condition-based, predictive, and prescriptive asset management, connecting operational data with maintenance planning, risk assessment, resource optimization, and commercial decision-making. The course covers both onshore and offshore applications and uses practical case studies involving gearbox health, turbine performance, SCADA anomaly detection, digital-twin implementation, structural integrity, RUL forecasting, and maintenance optimization. Current research demonstrates the growing use of heterogeneous data including SCADA, inspection records, environmental information, and maintenance histories to support faster and more informed O&M decisions.

Programme Curriculum

Wind Farm Asset Management Training Course

Introduction

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Course Duration

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Course Objectives

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

1. Develop strategic wind-farm asset management frameworks aligned with business and energy objectives.
2. Apply risk-based asset management and reliability-centered maintenance principles.
3. Analyze SCADA data to identify performance deviations and emerging asset-health issues.
4. Implement condition monitoring strategies for critical turbine components.
5. Apply predictive maintenance and predictive analytics to reduce unplanned downtime.
6. Understand AI and machine-learning applications for wind-turbine fault detection and forecasting.
7. Design and evaluate digital-twin applications for wind-farm O&M.
8. Estimate remaining useful life (RUL) and interpret prognostic uncertainty.
9. Optimize maintenance scheduling, workforce deployment, spare parts, and logistics.
10. Apply lifecycle cost, reliability, availability, and performance analysis to asset decisions.
11. Evaluate offshore wind O&M risks, including weather, access, marine logistics, and structural integrity.
12. Develop data-driven performance optimization strategies for wind-turbine fleets.
13. Build an integrated roadmap toward intelligent, predictive, prescriptive, and increasingly autonomous O&M.

Target Audience

1. Wind-farm asset managers
2. Renewable-energy O&M managers
3. Wind-turbine operations engineers
4. Reliability and maintenance engineers
5. SCADA, data, and performance analysts
6. Renewable-energy project and portfolio managers
7. Engineering, inspection, and condition-monitoring specialists
8. Energy executives responsible for wind-farm performance and lifecycle value

Course Modules

Module 1 — Wind Farm Asset Management Fundamentals

- Asset-management lifecycle from commissioning to **decommissioning**
- Asset hierarchy, criticality assessment, and **risk-based prioritization**
- KPIs: availability, reliability, capacity factor, energy yield, and downtime
- Maintenance strategies
- **Case study:** Developing an asset-management strategy for a multi-turbine wind farm

Module 2 — Reliability, Risk & Lifecycle Asset Strategy

- Reliability engineering and **failure-mode analysis**
- FMEA/FMECA and critical-component identification
- Risk matrices and **risk-based maintenance**
- Lifecycle cost and total cost of ownership
- **Case study:** Prioritizing gearbox, generator, and blade risks across a turbine fleet

Module 3 — SCADA, IoT & Condition Monitoring

- SCADA architecture and operational-data quality
- **IoT sensors** and real-time asset-health monitoring
- Vibration, temperature, oil, electrical, and structural monitoring
- Anomaly detection and **early-warning indicators**
- **Case study:** Using SCADA signals to identify a developing gearbox anomaly; recent research demonstrates that advanced analytics can detect pre-fault signatures ahead of documented failures.

Module 4 — Predictive Maintenance, AI & Machine Learning

- Predictive-maintenance concepts and workflows
- **Machine learning** for anomaly and fault detection
- Feature engineering and health-indicator development
- Predictive alerts, model validation, and explainable AI
- **Case study:** Building a predictive-maintenance workflow from historical turbine data

Module 5 — Digital Twins & Intelligent Wind O&M

- Digital-twin architecture and asset-data integration
- Physics-based, data-driven, and **hybrid digital twins**
- Real-time monitoring, diagnostics, and prognostics
- Digital twins for turbine, component, and farm-level optimization
- **Case study:** Developing a digital-twin roadmap for wind-farm O&M

Module 6 — Remaining Useful Life & Predictive Asset Health

- **RUL forecasting** and degradation modeling
- Prognostics and health-management (**PHM**) principles
- Uncertainty quantification and probabilistic forecasting
- Corrosion, fatigue, and structural-health considerations
- **Case study:** Probabilistic digital-twin assessment for offshore wind structural integrity and maintenance optimization.

Module 7 — Maintenance Optimization, Logistics & Commercial Performance

- Maintenance scheduling and **opportunistic maintenance**
- Workforce, vessel, crane, and spare-parts optimization
- Weather-window and offshore-access considerations
- Downtime, energy-loss, and lifecycle-cost optimization
- **Case study:** Optimizing offshore maintenance activities by combining asset health, weather, resources, and cost information

Module 8 — Advanced Wind Farm Performance & Future O&M

- Fleet-level **performance optimization**
- Prescriptive analytics and decision intelligence
- Cybersecurity, data governance, and interoperability
- Autonomous and AI-enabled O&M concepts
- **Case study:** Designing a 2030-ready intelligent wind-farm operating model integrating digital twins, predictive analytics, and automated decision support

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
21 Sep 2026	25 Sep 2026	Online	$1,000
21 Sep 2026	25 Sep 2026	Physical	$1,500
21 Sep 2026	25 Sep 2026	Physical	$0
21 Sep 2026	25 Sep 2026	Physical	$0
21 Sep 2026	25 Sep 2026	Physical	$0
21 Sep 2026	25 Sep 2026	Physical	$0
21 Sep 2026	25 Sep 2026	Physical	$0
21 Sep 2026	25 Sep 2026	Physical	$0

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