Onshore Wind Project Engineering 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

Onshore Wind Project Engineering Training Course is designed to develop advanced knowledge of wind farm engineering, renewable energy systems, project development, turbine technology, wind resource assessment, electrical integration, structural engineering, construction, commissioning, and asset performance. As wind power continues to expand within the global clean-energy transition, engineers and project professionals need an integrated understanding of the complete project lifecycle from early feasibility and site assessment through detailed engineering, construction, grid connection, operations, and performance optimization. Current professional training increasingly emphasizes practical engineering, real-world examples, case studies, software-based exercises, and standards-based site assessment.

The course combines technical engineering principles with project execution and commercial awareness, enabling participants to evaluate onshore wind projects from both engineering and delivery perspectives. Key themes include wind resource characterization, turbine selection, micrositing, wake effects, foundations, roads and logistics, collection systems, grid integration, SCADA, reliability, HSE, risk management, CAPEX/OPEX, energy yield, digitalization, AI-enabled analytics, and lifecycle optimization. Practical case studies are incorporated throughout the program to help participants translate engineering concepts into realistic project decisions. This approach reflects contemporary wind-energy training that combines theory, exercises, software demonstrations, and project-based case studies.

Programme Curriculum

Onshore Wind Project Engineering Training Course

Introduction

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Course Objectives

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

1. Analyze wind resources, meteorological data, terrain characteristics, and site suitability for utility-scale onshore wind projects.
2. Evaluate turbine technologies, specifications, performance curves, and technology-selection criteria.
3. Apply wind-flow modeling, micrositing, wake-loss assessment, and energy-yield methodologies.
4. Develop preliminary wind farm layouts considering terrain, setbacks, access, noise, environmental constraints, and constructability.
5. Assess turbine foundations, geotechnical requirements, structural loading, and civil infrastructure.
6. Design and evaluate electrical collection systems, substations, transformers, protection systems, and grid interconnection.
7. Interpret IEC-based engineering requirements, technical standards, codes, and project compliance requirements.
8. Apply SCADA, condition monitoring, data analytics, and AI-enabled predictive maintenance concepts to wind assets.
9. Evaluate construction sequencing, logistics, installation planning, commissioning, and quality assurance.
10. Analyze project CAPEX, OPEX, energy production, financial assumptions, and lifecycle economics.
11. Identify and mitigate engineering, environmental, construction, operational, regulatory, and supply-chain risks.
12. Optimize wind farm performance through availability analysis, loss assessment, reliability engineering, and lifecycle strategies.
13. Integrate engineering, project management, sustainability, digitalization, and energy-transition principles into bankable onshore wind projects.

Target Audience

1. Renewable Energy Engineers
2. Wind Project Engineers
3. Mechanical and Electrical Engineers
4. Civil and Structural Engineers

5. Power Systems and Grid Engineers
6. EPC, Construction, and Commissioning Professionals
7. Wind Farm Developers, Project Managers, and Consultants
8. Energy Analysts, Asset Managers, Sustainability Professionals, and Technical Researchers

Course Modules

Module 1: Onshore Wind Energy Fundamentals & Project Lifecycle

- Wind-energy principles and modern turbine architecture
- Utility-scale wind farm components and configurations
- Project lifecycle-development, engineering, construction, commissioning, and operations
- Capacity factor, availability, losses, and performance indicators
- **Case Study:** Preliminary engineering review of a utility-scale onshore wind project

Module 2: Wind Resource Assessment & Site Characterization

- Meteorological measurements, wind roses, Weibull distributions, and data quality
- Terrain, roughness, elevation, turbulence, and extreme wind conditions
- Wind-flow modeling and **micrositing**
- Energy-yield assessment and uncertainty analysis
- **Case Study:** Site assessment and turbine-layout optimization using representative wind data

Module 3: Turbine Technology, Aerodynamics & Mechanical Engineering

- Rotor, blades, nacelle, gearbox, generator, pitch, and yaw systems
- Turbine power curves and aerodynamic performance
- Turbine technology selection and site-specific suitability
- Reliability, fatigue, component degradation, and lifetime considerations
- **Case Study:** Comparative turbine selection for a high-turbulence onshore site

Module 4: Civil, Structural & Geotechnical Engineering

- Wind turbine foundation concepts and geotechnical investigations
- Roads, crane pads, drainage, cable trenches, and site infrastructure
- Structural loads, fatigue, soil conditions, and foundation optimization
- Construction tolerances, quality control, and inspection
- **Case Study:** Foundation and access-road engineering review for challenging terrain

Module 5: Electrical Engineering, Grid Integration & Power Systems

- Medium-voltage collection networks and transformers
- Substation design, protection, metering, and power-quality considerations
- Grid-code compliance and interconnection studies
- Reactive power, voltage control, frequency response, and power electronics
- **Case Study:** Grid-connection assessment for a large onshore wind farm

Module 6: Construction, Installation, Commissioning & HSE

- EPC delivery strategy and engineering interfaces
- Turbine transportation, lifting, erection, installation, and commissioning
- Construction sequencing, logistics, quality assurance, and documentation

- HSE, risk assessment, environmental controls, and safe work practices
- **Case Study:** Construction recovery plan following schedule and logistics constraints

Module 7: SCADA, Digital Wind Farms, Reliability & Performance Optimization

- SCADA architecture and operational data interpretation
- Condition monitoring and predictive-maintenance principles
- **AI, machine learning, digital twins, and advanced analytics**
- Availability, power-curve verification, losses, and performance optimization
- **Case Study:** SCADA-based diagnosis of underperformance and development of an optimization plan

Module 8: Project Economics, Risk, Sustainability & Lifecycle Management

- CAPEX, OPEX, LCOE, energy yield, and project financial drivers
- Technical due diligence and **bankability** considerations
- Engineering risk registers, sensitivity analysis, and mitigation strategies
- ESG, environmental sustainability, community considerations, and lifecycle planning
- **Case Study:** Integrated technical and commercial evaluation of an onshore wind project

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

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

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