Advanced Energy Forecasting Technologies Training Course

Professional Development Training Course Outline

Category	Renewable Energy	**Duration**	10 Days
Base Fee	$3,000 USD	**Delivery Mode**	Online / On-site Hybrid

Course Introduction

Advanced Energy Forecasting Technologies Training Course is designed to equip energy professionals with advanced knowledge of AI-driven energy forecasting, machine learning algorithms, renewable energy prediction, smart grid analytics, and digital energy transformation. As global energy systems transition toward decarbonization, renewable integration, energy resilience, and intelligent grid management, accurate forecasting has become essential for optimizing generation, storage, trading, and demand-side management. This course explores cutting-edge forecasting frameworks using Artificial Intelligence (AI), Internet of Things (IoT), Big Data analytics, cloud computing, predictive modeling, and advanced statistical techniques to improve energy system efficiency and reliability.

The program provides practical expertise in developing and implementing next-generation energy forecasting solutions for utilities, renewable energy companies, grid operators, energy traders, and sustainability organizations. Participants will gain insights into solar power forecasting, wind energy prediction, load forecasting, electricity market analytics, energy storage forecasting, digital twins, and real-time energy intelligence platforms. Through industry case studies and hands-on learning approaches, learners will understand how emerging technologies are shaping the future of smart energy systems, net-zero strategies, and sustainable energy management.

Programme Curriculum

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Course Duration

10 days

Course Objectives

By completing this course, participants will be able to:

1. Understand the fundamentals of advanced energy forecasting technologies and digital energy transformation.
2. Apply Artificial Intelligence (AI) and Machine Learning (ML) techniques for energy prediction.
3. Develop advanced short-term, medium-term, and long-term energy forecasting models.
4. Analyze renewable energy forecasting challenges for solar and wind power systems.
5. Utilize deep learning algorithms for high-accuracy energy forecasting.
6. Implement smart grid forecasting solutions using real-time operational data.
7. Apply Big Data analytics and cloud-based forecasting platforms.
8. Improve energy efficiency through predictive analytics and demand forecasting.
9. Understand the role of IoT-enabled energy monitoring and forecasting systems.
10. Evaluate forecasting accuracy using modern performance metrics and validation techniques.
11. Explore digital twins and simulation technologies for energy optimization.
12. Develop forecasting strategies supporting net-zero energy goals and sustainability targets.
13. Identify future trends in autonomous energy systems and intelligent forecasting technologies.

Target Audience

1. Energy engineers and power system professionals
2. Renewable energy project developers
3. Utility company managers and operators
4. Smart grid specialists
5. Energy analysts and consultants
6. Data scientists working in energy sectors
7. Sustainability and ESG professionals
8. Energy trading and market specialists

Course Modules

Module 1: Fundamentals of Advanced Energy Forecasting

- Introduction to modern energy forecasting frameworks
- Evolution from traditional forecasting to AI-based systems
- Role of forecasting in smart grids and renewable integration
- Energy forecasting challenges and industry trends
- Key performance indicators for forecasting accuracy
- **Case Study:** Implementation of advanced forecasting systems by a global utility company to improve grid reliability.

Module 2: Energy Data Analytics and Forecasting Foundations

- Energy data sources and collection methodologies
- Data cleaning and preprocessing techniques
- Time-series analysis for energy applications
- Data visualization for forecasting insights
- Building forecasting-ready datasets
- **Case Study:** Energy consumption forecasting using historical demand data from commercial buildings.

Module 3: Artificial Intelligence in Energy Forecasting

- AI applications in modern energy systems
- Machine learning forecasting architectures
- Supervised and unsupervised learning techniques
- Feature engineering for energy prediction
- AI-driven decision support systems
- **Case Study:** AI-based electricity demand forecasting platform deployment.

Module 4: Machine Learning Algorithms for Energy Prediction

- Regression models for energy forecasting
- Random forest and gradient boosting techniques
- Support vector machines for prediction accuracy
- Model training and optimization
- Forecasting model comparison strategies
- **Case Study:** Machine learning model optimization for regional electricity demand forecasting.

Module 5: Deep Learning and Neural Network Forecasting

- Artificial neural networks for energy prediction
- Recurrent Neural Networks (RNN)
- Long Short-Term Memory (LSTM) networks
- Deep learning forecasting architectures
- Improving prediction accuracy through advanced models
- **Case Study:** Deep learning model for renewable power generation prediction.

Module 6: Renewable Energy Forecasting Technologies

- Solar energy forecasting methods
- Wind power prediction technologies
- Weather-based forecasting models
- Renewable uncertainty management
- Integration of renewable forecasts into grids

- **Case Study:** Solar farm output forecasting using satellite weather data.

Module 7: Smart Grid Forecasting and Grid Intelligence

- Smart grid architecture and forecasting needs
- Real-time grid monitoring systems
- Grid stability forecasting
- Demand response optimization
- Intelligent grid management
- **Case Study:** Smart grid forecasting implementation for reducing peak demand.

Module 8: Electricity Load Forecasting Strategies

- Short-term load forecasting techniques
- Medium and long-term demand prediction
- Consumer behavior analytics
- Industrial load forecasting
- Peak demand management
- **Case Study:** Utility-scale load forecasting improvement using AI models.

Module 9: IoT and Real-Time Energy Forecasting

- IoT sensors in energy systems
- Real-time data acquisition
- Edge computing applications
- Connected energy management systems
- IoT-enabled predictive forecasting
- **Case Study:** IoT-based building energy optimization project.

Module 10: Big Data Analytics for Energy Forecasting

- Big Data platforms for energy applications
- Distributed data processing
- Advanced analytics techniques
- Cloud-based forecasting solutions
- Data-driven energy optimization
- **Case Study:** Big Data analytics platform for national energy demand prediction.

Module 11: Energy Storage Forecasting Technologies

- Battery energy storage forecasting
- State-of-charge prediction
- Storage optimization strategies
- Renewable-storage integration
- Future trends in energy storage intelligence
- **Case Study:** Battery storage forecasting for renewable energy balancing.

Module 12: Digital Twins and Simulation-Based Forecasting

- Digital twin concepts in energy systems
- Virtual energy system modeling
- Simulation-driven forecasting

- Predictive maintenance applications
- Real-time operational optimization
- **Case Study:** Digital twin implementation for power plant performance forecasting.

Module 13: Energy Market Forecasting and Trading Analytics

- Electricity price forecasting
- Market demand prediction
- Energy trading analytics
- Forecasting risks and uncertainties
- AI applications in energy markets
- **Case Study:** AI-based electricity price prediction for energy traders.

Module 14: Forecasting Accuracy, Validation, and Optimization

- Forecast evaluation methods
- Error measurement techniques
- Model benchmarking
- Forecast improvement strategies
- Continuous learning forecasting systems
- **Case Study:** Improving renewable forecast accuracy through model validation.

Module 15: Future Trends in Energy Forecasting Technologies

- Autonomous energy management systems
- Generative AI in energy forecasting
- Blockchain-enabled energy analytics
- Quantum computing opportunities
- Future smart energy ecosystems
- **Case Study:** Future-ready AI energy management system development.

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	04 Dec 2026	Online	$2,000
23 Nov 2026	04 Dec 2026	Physical	$3,000
23 Nov 2026	04 Dec 2026	Physical	$6,000
23 Nov 2026	04 Dec 2026	Physical	$6,000
23 Nov 2026	04 Dec 2026	Physical	$12,000
23 Nov 2026	04 Dec 2026	Physical	$9,000
23 Nov 2026	04 Dec 2026	Physical	$12,000
23 Nov 2026	04 Dec 2026	Physical	$12,000

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