AI for Smart Grid Optimization 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

Artificial Intelligence (AI) is revolutionizing the smart energy ecosystem, enabling advanced grid modernization, predictive analytics, and real-time energy optimization. As global demand for sustainable energy grows, utilities and energy providers are adopting machine learning, deep learning, and IoT-driven smart grids to enhance efficiency, reduce outages, and integrate renewable energy sources. AI for Smart Grid Optimization Training Course equips professionals with cutting-edge skills in AI-powered grid intelligence, energy forecasting, and automated decision-making systems.

The course focuses on practical implementation of AI algorithms for smart grid optimization, including load forecasting, fault detection, and energy demand management. Participants will gain hands-on experience with real-world tools and industry case studies, empowering them to drive digital transformation in energy systems. By leveraging big data analytics, cloud computing, and edge AI, this program prepares learners to design resilient, efficient, and sustainable power grids.

Programme Curriculum

AI for Smart Grid Optimization Training Course

Introduction
Artificial Intelligence (AI) is revolutionizing the smart energy ecosystem, enabling advanced grid modernization, predictive analytics, and real-time energy optimization. As global demand for sustainable energy grows, utilities and energy providers are adopting machine learning, deep learning, and IoT-driven smart grids to enhance efficiency, reduce outages, and integrate renewable energy sources. AI for Smart Grid Optimization Training Course equips professionals with cutting-edge skills in AI-powered grid intelligence, energy forecasting, and automated decision-making systems.

The course focuses on practical implementation of AI algorithms for smart grid optimization, including load forecasting, fault detection, and energy demand management. Participants will gain hands-on experience with real-world tools and industry case studies, empowering them to drive digital transformation in energy systems.

By leveraging big data analytics, cloud computing, and edge AI, this program prepares learners to design resilient, efficient, and sustainable power grids.

Course Duration

5 days

Course Objectives

1. Understand AI in smart grid transformation
2. Apply machine learning for energy forecasting
3. Implement predictive maintenance models
4. Optimize renewable energy integration
5. Develop real-time grid analytics solutions
6. Enhance energy efficiency using AI algorithms
7. Analyze big data in smart energy systems
8. Design automated demand response systems
9. Improve grid reliability and resilience
10. Utilize IoT-enabled smart grid technologies
11. Build deep learning models for anomaly detection
12. Explore AI-driven energy trading strategies
13. Deploy cloud-based smart grid solutions

Target Audience

1. Energy engineers and power system professionals
2. Data scientists and AI engineers
3. Utility and grid operators
4. Renewable energy specialists
5. Smart city planners
6. Electrical engineering students
7. IT professionals in energy sector
8. Government and policy makers

Course Modules

Module 1: Introduction to Smart Grids

- Smart grid architecture
- Digital transformation in energy
- Grid modernization concepts
- Energy ecosystem overview
- *Case Study: Smart grid deployment in Europe*

Module 2: Fundamentals of Artificial Intelligence

- AI concepts and applications
- Machine learning basics
- Deep learning overview
- AI tools and platforms
- *Case Study: AI adoption in utilities*

Module 3: Data Analytics for Smart Grids

- Big data in energy
- Data collection and preprocessing
- Visualization techniques
- Data-driven decision making
- *Case Study: Data analytics in power distribution*

Module 4: Load Forecasting ???????? AI

- Short-term forecasting
- Long-term forecasting
- Time series models
- Neural networks
- *Case Study: Load prediction in urban grids*

Module 5: Renewable Energy Integration

- Solar and wind forecasting
- Grid stability challenges
- Energy storage optimization
- Hybrid energy systems
- *Case Study: Renewable integration in smart cities*

Module 6: Predictive Maintenance

- Equipment monitoring
- Failure prediction models
- Sensor data analysis
- Maintenance scheduling
- *Case Study: Transformer failure prediction*

Module 7: Demand Response Optimization

- Demand-side management
- Consumer behavior analytics
- Dynamic pricing models
- AI-based optimization
- *Case Study: Smart demand response programs*

Module 8: IoT in Smart Grids

- IoT architecture
- Smart meters
- Edge computing
- Communication protocols
- *Case Study: IoT-enabled grid monitoring*

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

Start Date	End Date	Location	Price
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:

Register Online Now

Email: info@fineskilltrainingcenter.com | Website: www.fineskilltrainingcenter.com