Energy Data Analytics and Renewable Energy Systems Training Course

Professional Development Training Course Outline

Category	Research and Data Analysis	**Duration**	5 Days
Base Fee	$1,500 USD	**Delivery Mode**	Online / On-site Hybrid

Course Introduction

The global push toward sustainable energy has fueled the urgent need for professionals skilled in energy data analytics and renewable energy systems. As the world transitions from fossil fuels to clean energy, the ability to collect, analyze, and interpret large volumes of energy consumption data, grid performance metrics, and renewable output statistics is vital. Energy Data Analytics and Renewable Energy Systems Training Course equips participants with the latest tools and techniques in energy informatics, smart grid technologies, and predictive analytics, tailored specifically for renewable energy applications such as solar, wind, hydro, and biomass systems.

Designed for energy professionals, data scientists, engineers, and sustainability advocates, this course integrates advanced data analytics frameworks with practical knowledge of green technologies and energy optimization strategies. Through hands-on sessions, real-world case studies, and simulation-based training, participants will gain critical insights into how data-driven decisions can accelerate the shift to clean energy and support global decarbonization efforts. By the end of this training, learners will be fully equipped to lead innovation in the renewable energy sector using evidence-based strategies and cutting-edge technologies.

Programme Curriculum

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Course Objectives

1. Understand the fundamentals of energy data analytics and machine learning in energy systems.
2. Explore key renewable energy sources such as solar, wind, hydro, and biomass.
3. Analyze real-time energy consumption data using Python and R.
4. Apply predictive modeling for energy demand forecasting.
5. Integrate IoT technologies in renewable energy monitoring.
6. Conduct carbon footprint analysis using energy datasets.
7. Optimize smart grid operations using big data.
8. Utilize GIS mapping for renewable site selection.
9. Design energy efficiency strategies using analytics.
10. Apply AI and deep learning in energy system management.
11. Explore policies, incentives, and regulations impacting green energy markets.
12. Use data visualization tools like Power BI and Tableau for energy reports.
13. Evaluate financial models and ROI analysis for renewable energy investments.

Target Audience

1. Renewable Energy Engineers
2. Data Scientists and Energy Analysts
3. Utility and Grid Operators
4. Environmental Consultants
5. Sustainability and Energy Policy Makers
6. Engineering Students and Researchers
7. Climate Change Advocates
8. Energy Management Professionals

Course Duration: 5 days

Course Modules

Module 1: Introduction to Energy Data Analytics

- Fundamentals of energy informatics
- Overview of renewable vs. non-renewable systems
- Data sources: smart meters, sensors, satellites
- Basic tools: Python, R, Excel
- Data cleaning and preprocessing techniques
- **Case Study**: Energy data audit for a local utility company

Module 2: Solar and Wind Energy Systems

- Design and operation of PV systems and wind turbines
- Data monitoring: irradiance, wind speed, efficiency
- Inverter analytics and system performance
- Predicting solar/wind output with ML

- Energy storage integration
- **Case Study**: Optimization of solar farms using weather and sensor data

Module 3: Energy Forecasting and Load Modeling

- Short- and long-term demand forecasting
- Regression and time-series modeling
- Seasonal and behavioral pattern analysis
- Forecasting challenges in renewables
- Ensemble and hybrid models
- **Case Study**: Predicting peak loads for a regional power grid

Module 4: Smart Grids and IoT Integration

- Components of a smart grid
- IoT devices in energy monitoring
- Real-time data acquisition and control
- Communication protocols (MQTT, Zigbee)
- Edge analytics for distributed energy systems
- **Case Study**: Smart grid design for a university campus

Module 5: Big Data and Cloud Platforms

- Data lakes and real-time streaming
- Hadoop, Spark, and cloud integration (AWS, Azure)
- Data storage and security for energy datasets
- Batch vs. stream processing
- Scalability and cost considerations
- **Case Study**: Managing high-frequency data from national grid sensors

Module 6: Data Visualization and Decision Support

- Energy dashboards and KPI tracking
- Tools: Tableau, Power BI, D3.js
- Storytelling with energy data
- Visualizing anomalies and outliers
- Interactive dashboards for stakeholders
- **Case Study**: Visualizing power outages and response time

Module 7: Sustainability and Carbon Analytics

- Carbon emissions metrics and reporting
- Lifecycle analysis of energy systems
- Emissions reduction through analytics
- Linking energy usage with ESG goals
- Evaluating renewable alternatives for impact
- **Case Study**: Carbon audit of a corporate energy portfolio

Module 8: Financial and Policy Analysis

- Investment modeling for renewables
- Net present value and ROI in energy projects
- Subsidies, tariffs, and incentives
- Energy market modeling
- Policy impact simulations
- **Case Study**: Cost-benefit analysis for community solar deployment

Training Methodology

- Interactive lectures using real-world datasets
- Hands-on workshops with coding and simulation tools
- Group case study projects with guided mentorship
- Quizzes and assignments to reinforce learning
- Capstone project solving a live energy analytics challenge
- Post-training support and professional certification

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