Smart Metering Systems 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

Smart Metering Systems Training Course provides a practical and strategic understanding of Advanced Metering Infrastructure (AMI), Automated Meter Reading (AMR), smart grids, IoT connectivity, meter data management, energy analytics, cybersecurity, demand-side management, and digital utility transformation. As utilities increasingly move from conventional metering toward connected and data-driven operations, smart meters are becoming important tools for improving billing accuracy, reducing technical and non-technical losses, strengthening revenue assurance, monitoring consumption, and enabling more responsive grid management. Current professional training trends emphasize AMI architecture, communication technologies, cybersecurity, analytics, consumer engagement, project execution, and real-world deployment experience.

This course develops the technical, managerial, and analytical capabilities required to design, deploy, operate, secure, and optimize smart metering ecosystems. Participants explore the complete smart-metering value chain from meter hardware and communications through Head-End Systems (HES), Meter Data Management Systems (MDMS), analytics, billing integration, SCADA/GIS interoperability, AI-enabled insights, distributed energy resources (DERs), and demand response. Practical case studies are incorporated to connect concepts with real utility challenges, including large-scale AMI rollouts, loss reduction, data-driven revenue protection, customer engagement, and cyber-resilient digital infrastructure. These themes reflect current industry priorities in smart metering and grid modernization.

Programme Curriculum

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Course Duration

5 days

Course Objectives

1. Understand Smart Metering, AMI, AMR, and Smart Grid architectures and applications.
2. Evaluate smart meter technologies, metrology, sensors, firmware, and communication modules.
3. Develop competence in RF Mesh, PLC, cellular, NB-IoT, LoRaWAN, and 5G-enabled metering communications.
4. Understand Head-End Systems (HES), MDMS, data acquisition, validation, and integration.
5. Apply AI, machine learning, advanced analytics, and load profiling to smart-meter data.
6. Develop strategies for revenue assurance, fraud analytics, tamper detection, and loss reduction.
7. Design effective Demand-Side Management (DSM), demand response, and Time-of-Use (TOU) pricing initiatives.
8. Strengthen knowledge of AMI cybersecurity, data privacy, authentication, encryption, and incident response.
9. Examine SCADA, GIS, ADMS, DER, solar PV, battery storage, EV, and smart-grid integration.
10. Improve skills in smart-meter rollout planning, project management, commissioning, and quality assurance.
11. Assess interoperability, scalability, data governance, and digital utility transformation requirements.
12. Evaluate business cases, cost-benefit analysis, financing, procurement, and lifecycle management for smart-metering projects.
13. Develop future-ready strategies incorporating edge computing, AI-enabled utilities, IoT, digital twins, and transactive energy.

Target Audience

1. Utility Engineers and Metering Specialists
2. Smart Grid and Distribution Engineers
3. Energy Managers and Consultants
4. AMI/AMR Project Managers and System Integrators
5. IT, OT, IoT and Cybersecurity Professionals
6. Data Analysts and Energy Intelligence Teams

7. Regulators, Policymakers and Utility Executives
8. Billing, Revenue Protection and Customer-Service Professionals

Course Modules

Module 1: Smart Metering Fundamentals, AMI & Smart Grid Transformation

- Evolution from conventional meters to AMI/AMR and intelligent metering ecosystems.
- Smart-meter components, metrology, processors, communications, and remote functionality.
- Smart grid architecture and the role of advanced metering in grid modernization.
- Operational benefits: real-time visibility, automated billing, outage intelligence, and loss reduction.
- **Case Study:** Analysis of a large-scale AMI transformation and lessons for utility modernization.

Module 2: Smart Meter Technologies & Communication Networks

- Residential, commercial, industrial, prepaid, and advanced smart-meter technologies.
- **RF Mesh, PLC, cellular, NB-IoT, LoRaWAN, and 4G/5G** communication options.
- HAN, NAN/FAN, WAN and utility communication architectures.
- Network performance, reliability, latency, scalability, and interoperability.
- **Case Study:** Selecting an appropriate communication architecture for an urban versus rural AMI rollout.

Module 3: AMI Architecture, HES, MDMS & Digital Integration

- Head-End Systems (HES) and secure meter-to-utility communication.
- Meter Data Management Systems (MDMS) and data validation, estimation, and editing.
- Integration with billing, CRM, GIS, SCADA, ADMS, ERP, and outage-management systems.
- Interoperability, APIs, data models, and digital utility architecture.
- **Case Study:** Designing an end-to-end AMI data flow from smart meter to customer bill.

Module 4: Smart Meter Data Analytics, AI & Revenue Intelligence

- Consumption profiling, load forecasting, anomaly detection, and visualization.
- **AI and machine learning** applications for smart-meter intelligence.
- Technical and non-technical loss analytics.
- **Tamper detection, fraud analytics, revenue assurance, and billing accuracy**.
- **Case Study:** Using consumption anomalies to identify potential revenue leakage and prioritize field investigations.

Module 5: Demand-Side Management, Demand Response & DER Integration

- Principles of Demand-Side Management (DSM) and demand response.
- Time-of-Use, dynamic pricing, behavioral demand response, and load shifting.
- Integration of solar PV, battery energy storage, EVs, microgrids, and distributed energy resources.
- Smart-meter-enabled energy efficiency and customer engagement.
- **Case Study:** Developing a smart-meter-based demand-response program to manage peak demand.

Module 6: Cybersecurity, Data Privacy & Smart Utility Resilience

- Cybersecurity risks across **AMI, IoT, HES, MDMS, SCADA, and OT/IT environments**.
- Authentication, authorization, encryption, secure communications, and access control.
- **Data governance, privacy, integrity, audit trails, and secure data management**
- Threat monitoring, incident response, vulnerability management, and cyber resilience.

- **Case Study:** Building a cybersecurity response framework for a compromised AMI communication environment.

Module 7: Smart Meter Deployment, Operations & Project Management

- AMI business cases, deployment strategies, procurement, and vendor management.
- Meter installation, commissioning, testing, calibration, and quality assurance.
- **Project governance, rollout scheduling, workforce management, and change management**
- KPIs for meter performance, communications, data quality, billing, and customer adoption.
- **Case Study:** Developing a phased rollout plan for a utility-wide smart-meter deployment.

Module 8: Future Smart Metering, Digital Utilities & Innovation

- **Edge computing, AI-enabled utilities, IoT, digital twins, and predictive analytics.**
- Smart metering integration with **ADMS, DERMS, virtual power plants, and smart cities.**
- Blockchain and emerging models for decentralized and transactive energy.
- Future customer platforms, digital engagement, and data-driven utility services.
- **Case Study:** Creating a 2030 smart-utility roadmap combining AMI, AI, DERs, EVs, and advanced analytics.

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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