Training Course on Electricity Market Design and Operation for Engineers

Professional Development Training Course Outline

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

Course Introduction

Introduction

In the rapidly evolving energy landscape, understanding the design and operation of electricity markets is essential for engineers, regulators, and stakeholders. As the world transitions toward renewable integration, smart grids, and decentralized generation, electricity markets must evolve to remain efficient, reliable, and fair. Training Course on Electricity Market Design and Operation for Engineers equips engineers with in-depth knowledge of market structures, pricing mechanisms, grid reliability, and regulatory frameworks that underpin both traditional and modern power markets.

Participants will explore critical topics including wholesale and retail market operations, day-ahead and real-time markets, capacity and ancillary services markets, and transmission congestion management. Through hands-on simulations, real-world case studies, and interactive tools, engineers will gain practical skills to navigate dynamic electricity markets while supporting grid decarbonization, demand response, and energy trading innovations.

Programme Curriculum

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Course Objectives

1. Understand core electricity market structures (wholesale/retail)
2. Analyze nodal and zonal pricing mechanisms
3. Evaluate market clearing, LMP, and settlement processes
4. Design capacity markets and ancillary service mechanisms
5. Understand demand response and distributed energy integration
6. Explore renewable energy participation in electricity markets
7. Examine transmission constraints and congestion pricing
8. Assess the role of ISOs, RTOs, and regulators
9. Use forecasting tools for market operation and planning
10. Analyze power purchase agreements (PPAs) and bilateral trading
11. Model market simulations using case studies and software tools
12. Understand market risks, volatility, and hedging strategies
13. Align electricity market design with decarbonization policies

Organizational Benefits

1. Better market risk mitigation and hedging decisions
2. Enhanced grid reliability through informed engineering
3. Improved forecasting and load balancing accuracy
4. Strategic bidding in energy markets
5. Compliance with regulatory requirements and reforms
6. Optimized integration of renewables into power markets
7. Lower operational and procurement costs
8. Informed policy and tariff design recommendations
9. Engineering teams aligned with market-driven operations
10. Competitive edge in global electricity trading platforms

Target Participants

- Power System Engineers
- Energy Traders and Analysts
- Grid Planners and Operators

- Utility Professionals
- Regulatory and Compliance Officers
- Renewable Energy Project Developers
- Energy Economists and Consultants
- Policy Makers and Tariff Designers
- Electrical Engineering Students
- System Integration Specialists

Course Outline

Module 1: Fundamentals of Electricity Markets

1. Market liberalization and deregulation history
2. Roles of buyers, sellers, and intermediaries
3. Physical vs financial markets
4. Basic economics of electricity pricing
5. Case Study: Evolution of the US electricity market

Module 2: Market Structures and Regulatory Frameworks

1. Wholesale and retail electricity markets
2. Independent System Operators (ISOs) and RTOs
3. Role of regulators and market rules
4. Licensing and market entry requirements
5. Case Study: EU Internal Electricity Market

Module 3: Market Operations and Dispatch Models

1. Central dispatch and merit order
2. Day-ahead vs real-time markets
3. Market clearing mechanisms
4. Load forecasting and generation scheduling
5. Case Study: PJM real-time market operations

Module 4: Pricing Mechanisms and Settlement

1. Locational Marginal Pricing (LMP)
2. Zonal vs nodal pricing
3. Market settlement process
4. Price volatility and risk exposure
5. Case Study: LMP analysis in ERCOT

Module 5: Ancillary Services and Capacity Markets

1. Frequency and voltage control services
2. Reserve margin and spinning reserve
3. Capacity markets and reliability obligations
4. Reactive power pricing
5. Case Study: Capacity market reform in the UK

Module 6: Transmission and Congestion Management

1. Congestion pricing and redispatch
2. Transmission rights and tariffs
3. Grid constraints and loop flows

4. Financial Transmission Rights (FTRs)
5. Case Study: Congestion revenue rights in California

Module 7: Renewable Energy and Market Integration

1. Renewable energy certificates (RECs)
2. Priority dispatch and curtailment

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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