



Advanced Wide-Area Monitoring and PMU Analytics Training Course



AGILE LEADERS
Training Center

Advanced Wide-Area Monitoring and PMU Analytics Training Course

Overview

Advanced Wide-Area Monitoring and PMU Analytics Training Course is a two-week course for power system engineers, control-center analysts, protection and stability specialists, utility data engineers, and transmission operations managers who leave with a Wide-Area Monitoring and Analytics Pack. Participants connect synchronized measurement chains, PMU streams, phasor data concentrators, data quality, visualization, oscillation analysis, and event reconstruction. The course turns high-rate phasor data into governed operational evidence. Agile Leaders Training Center develops wide-area monitoring practice.

Who Should Attend

- Power system functions responsible for transmission analysis, stability, and operating limits
- Control-center functions responsible for situational awareness and event response
- Protection functions responsible for disturbance evidence and coordinated schemes
- Utility data functions responsible for PMU streams, concentrators, quality, and access
- Operations management functions responsible for monitoring use cases and decision governance

The course assumes participants already interpret power-system quantities and operating diagrams; it leaves out PMU product certification, relay setting design, and software coding.

Departments and Industries

The course supports departments and industries that monitor and operate interconnected electric power systems.



- Transmission operations, system planning, protection, automation, and control centers
- Generation, renewable integration, interconnection, and grid-support functions
- Utility data engineering, telecommunications, cybersecurity, and analytics functions
- Engineering consultancies, equipment vendors, testing laboratories, and research organizations
- Industrial power networks, transport electrification, and critical infrastructure operators

Learning Objectives

By the end of this course, participants will be able to:

- Build a wide-area measurement architecture and data-flow map.
- Apply IEEE C37.118.2-2024 messaging concepts and PMU data-quality controls.
- Analyze phase angle, frequency, oscillation, and disturbance evidence.
- Diagnose timing, coverage, consistency, and stream-availability problems.
- Evaluate monitoring displays, alerts, and operational use cases.
- Build a Wide-Area Monitoring and Analytics Pack.



Course Agenda

Day 1: Frame Wide-Area Monitoring

- Wide-Area Monitoring Use-Case Canvas
- Synchrophasor Measurement Chain Map
- PMU, PDC, and Application Role Model
- SCADA and Synchrophasor Comparison Matrix
- Monitoring Decision and Evidence Register

Day 2: Examine PMU Measurements

- Voltage and Current Phasor Representation Model
- Frequency and Rate-of-Change Measure Dictionary
- Time Synchronization and Timestamp Trace
- PMU Reporting Rate and Latency Profile
- Measurement Accuracy and Metadata Record



Day 3: Design Data Concentration

- Phasor Data Concentrator Architecture Diagram
- PMU Stream Aggregation and Alignment Method
- Hierarchical PDC Routing and Redundancy Map
- Communication Delay and Availability Budget
- Source-to-Application Data Lineage View

Day 4: Apply Data Transfer Concepts

- IEEE C37.118.2-2024 Message Structure Map
- Configuration, Data, Header, and Command Frame Table
- Data Type and Format Validation Checklist
- Stream Interface and Protocol Boundary Matrix
- PMU-to-PDC Interoperability Test Record

Day 5: Control Synchrophasor Quality

- Accuracy, Availability, and Timeliness Scorecard
- Coverage and Consistency Assessment Grid
- Missing, Stale, and Outlier Data Diagnostic
- Timestamp and Topology Alignment Checklist
- Data Quality Exception and Remediation Log

Day 6: Build Monitoring Displays

- Phase-Angle Difference Visualization Pattern
- Frequency and ROCOF Trend Display
- Voltage Magnitude and Corridor Stress View
- PMU Stream Health and Quality Dashboard
- Alert Threshold and Escalation Matrix

Day 7: Analyze Oscillations

- Oscillation Detection Signal Review Method
- Mode Frequency and Damping Evidence Table
- Inter-Area Oscillation Location Map
- Event Window and Baseline Comparison Profile
- Oscillation Alert Confidence Record

Day 8: Reconstruct Grid Events

- Disturbance Timeline Reconstruction Method
- Phase-Angle Separation and Recovery Plot
- Frequency Excursion and ROCOF Event Profile
- Protection Operation and PMU Evidence Crosswalk
- Post-Event Analysis Report Structure



Day 9: Govern Operational Use Cases

- Wide-Area Monitoring Use-Case Priority Matrix
- Display, Alert, and Decision Ownership Model
- Data Retention and Access Requirement Register
- Monitoring Limitation and Decision-Risk Log
- Deployment and Operational Readiness Checklist

Day 10: Practice PMU Analytics Reviews

- Exercise: Diagnose a PMU Stream Quality Issue
- Exercise: Interpret a Phase-Angle Separation
- Exercise: Analyze an Oscillation Event
- Exercise: Reconstruct a Grid Disturbance
- Capstone: Wide-Area Monitoring and Analytics Pack

Practical Exercises

The course uses suggested activities based on transmission corridors, generation events, renewable integration, and industrial-grid cases.



- Suggested activity: trace synchronized measurements from PMUs through concentrators to an operational display.
- Suggested activity: diagnose timing, availability, consistency, coverage, and metadata defects in a PMU stream.
- Suggested activity: compare phase angle, frequency, damping, and disturbance evidence across an event window.
- Suggested activity: present a monitoring use case with limits, thresholds, owners, and response actions.

FAQs

Who suits wide-area monitoring and PMU analytics training, and what does it assume?

Power system, control-center, protection, stability, utility data, and transmission operations functions suit the training. Wide-area monitoring assumes regular interpretation of power-system quantities and operating diagrams.

How does PMU analytics differ from conventional power-system monitoring training?

PMU analytics focuses on time-synchronized phasor streams, phase-angle relationships, high-rate frequency evidence, data concentrators, quality controls, oscillations, and event reconstruction, while conventional monitoring relies on slower and less synchronized operational measurements.

Why is IEEE C37.118.2-2024 relevant to PMU analytics?

IEEE C37.118.2-2024 defines messaging for real-time communication between PMUs, phasor data concentrators, and applications, providing the data-transfer structure that PMU analytics workflows must interpret.

How does PMU data quality affect wide-area monitoring?

PMU data quality affects whether phase angle, frequency, oscillation, and disturbance evidence can be trusted; accuracy, availability, timeliness, coverage, consistency, metadata, and stream paths must be assessed.



What does a wide-area monitoring review produce?

A wide-area monitoring review produces a documented interpretation of system conditions, data limitations, alerts, event evidence, operational implications, decision ownership, and follow-up actions.

Conclusion

Participants take back a Wide-Area Monitoring and Analytics Pack containing architecture maps, data-flow views, quality controls, display designs, oscillation records, event reconstructions, use-case priorities, and readiness checks. It changes raw PMU streams into governed operational evidence. The pack supports traceable monitoring, consistent reviews, and accountable grid decisions.



Training Course Categories

Agile PM and Project Management Training Courses

Agribusiness & Food Security Training Courses

Certified Courses By International Bodies

Communication and Public Relations Training Courses

Crisis Management and Business Continuity Training Courses

Data Analytics Training and Data Science Courses

Digital Government & Public Service Training Courses

Education and Learning Development Training Courses

Environment & Sustainability Training Courses

Facilities and Real Estate Training Courses

Finance and Accounting Training Courses

Governance, Risk and Compliance Training Courses

Healthcare Management Training Courses

Heritage Conservation and Museum Management Training Courses

Hospitality and Tourism Training Courses

Human Resources Training and Development Courses

IT Security Training & IT Training Courses

Leadership and Management Training Courses

Legal Training, Procurement and Contracting Courses

Maintenance Training and Engineering Training Courses

Marketing, Customer Relations, and Sales Courses

NGO, Humanitarian and Development Management Training Courses

Occupational Health, Safety and Security Training Courses

Oil & Gas Training and Other Technical Courses

Personal & Self-Development Training Courses

Quality and Operations Management Training Courses



Training Course Categories

Secretarial and Administration Training Courses

Shipping, Maritime and Ports Training Courses

Training Cities

Abu Dhabi UAE	Accra Ghana	Amman Jordan
Amsterdam Netherlands	Athens Greece	Baku Azerbaijan
Bali Indonesia	Bangkok Thailand	Barcelona Spain
Berlin Germany	Cairo Egypt	Cape town South Africa
Casablanca Morocco	Chicago USA	Doha Qatar
Dubai UAE	Frankfurt Germany	Geneva Switzerland
Istanbul Turkey	Jakarta Indonesia	Johannesburg South Africa
Kuala Lumpur Malaysia	Kuwait Kuwait	Langkawi Malaysia
Lisbon Portugal	London UK	Madrid Spain
Manama Bahrain	Marbella Spain	Milan Italy
Montreux Switzerland	Munich Germany	Muscat Oman
Nairobi Kenya	New York USA	Nice France



Training Cities

Paris

France

Phuket

Thailand

Port Louis

Mauritius

Porto

Portugal

Prague

Czech Republic

Rome

Italy

San Diego

USA

Seoul

South Korea

Sharm El-Sheikh

Egypt

Singapore

Singapore

Tashkent

Uzbekistan

Tbilisi

Georgia

Tokyo

Japan

Toronto

Canada

Trabzon

Turkey

Vienna

Austria

Zanzibar

Tanzania

Zoom

Online Training

Zurich

Switzerland