MAWA EVENTS

Address: No. 857, Block A2. Leisure Commerce Square - No 9., 46150 Petaling Jaya, Selangor, Malaysia

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AUTOMATIC GENERATION CONTROL MASTERCLASS

""Mastering Frequency Regulation, Load Sharing, and Grid Stability through Advanced AGC Systems""

Schedule

Date	Venue	Fees (Face-to-Face)
01 – 05 Mar 2026	Manama, Bahrain	USD 3495 per delegate

► **Available delivery methods:** Face-to-Face & Online Training

Introduction

As electrical power systems evolve to integrate renewable sources, ensure grid reliability, and optimize operational efficiency, Automatic Generation Control (AGC) plays an increasingly critical role. AGC maintains system frequency and inter-area power flows by automatically adjusting the output of multiple generators in real time.

This 5-day masterclass provides an in-depth understanding of AGC systems, their control algorithms, communication frameworks, and integration with SCADA/EMS. It is designed for engineers and technical professionals involved in power system operations, control center management, and energy dispatch.

Objectives

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

- Understand the principles of automatic generation control and its role in grid stability
- Analyze frequency deviation and tie-line power flow variations
- Configure AGC loops and coordinate with governor and excitation systems
- Integrate AGC with SCADA/EMS platforms and communication protocols
- Diagnose and troubleshoot AGC performance and reliability issues

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Why Attend

- Gain expert-level understanding of AGC structure, logic, and implementation
- Learn how to model AGC behavior under varying system conditions
- Understand how AGC interacts with other control systems (AVR, PSS, turbine-governor)
- Improve grid frequency control and system response through advanced tuning
- Keep pace with evolving energy policies and grid code requirements for AGC

Target Audience

This program is designed for:

- Power system engineers and control room operators
- SCADA/EMS and automation engineers
- Generation dispatchers and grid coordinators
- Electrical and systems engineers in utilities and transmission companies
- Consultants, regulators, and system planners involved in energy control

Individual Benefits

Key competencies that will be developed include:

- Load-frequency control analysis and modeling
- AGC setpoint tuning and bias configuration
- System response analysis and performance validation
- Communication and signal flow mapping between AGC and SCADA/EMS
- Fault diagnosis and incident reporting related to AGC failures

Organizational Benefits

Upon completing the training course, participants will demonstrate:

- Improved system frequency stability and tie-line compliance
- Optimized load sharing and power dispatch efficiency
- Reduced grid instability and blackstart recovery times
- Greater coordination between generation units and dispatch control
- Readiness for AGC compliance under evolving regulatory frameworks

Instructional Methodology

The course follows a blended learning approach combining theory with practice:

- Strategy Briefings – AGC logic, grid frequency dynamics, and control principles
- Case Studies – Regional and international examples of AGC applications
- Workshops – Simulation of AGC responses and setpoint changes
- Peer Exchange – Cross-country experiences in control center operations
- Tools – AGC performance templates, signal flow diagrams, control checklists

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Course Outline

Training Hours: 07:30 AM – 03:30 PM Daily Format: 3–4 Learning Modules | Coffee Breaks: 09:30 & 11:15 | Lunch Break: 01:00 – 02:00

Day 1: Fundamentals of Load Frequency Control

- Module 1: Power System Control Objectives (07:30 – 09:30) • Generation-load balance and frequency deviations • Role of AGC in interconnected power systems
- Module 2: Primary and Secondary Control Overview (09:45 – 11:15) • Governor response and frequency droop • Tie-line bias and area control error (ACE)
- Module 3: Workshop – Frequency Response Simulation (11:30 – 01:00) • Analyze system response with and without AGC

Day 2: AGC Architecture and System Modeling

- Module 4: AGC Control Loops and Setpoints (07:30 – 09:30) • Control blocks and feedback structure • ACE calculation and filtering methods
- Module 5: Multi-Area Control and Tie-Line Bias (09:45 – 11:15) • Coordinated AGC between multiple balancing areas • Load sharing, bias tuning, and control deadbands
- Module 6: Workshop – AGC Loop Configuration (11:30 – 01:00) • Set up sample AGC loops with parameters and biases

Day 3: AGC Integration and SCADA/EMS Systems

- Module 7: AGC-SCADA-EMS Interface (07:30 – 09:30) • Signal flows, command hierarchy, and alarms • Data latency, scan rates, and communication protocols
- Module 8: System Monitoring and Control Setpoints (09:45 – 11:15) • Operator roles and SCADA screen configuration • Manual vs automatic dispatch control
- Module 9: Workshop – Designing AGC-SCADA Data Flow (11:30 – 01:00) • Create signal mapping for telemetry and feedback

Day 4: Performance Evaluation and Troubleshooting

- Module 10: AGC Performance Indices (07:30 – 09:30) • CPS1/CPS2, NERC performance metrics, and utility benchmarks • Real-time compliance monitoring
- Module 11: Common AGC Faults and Root Causes (09:45 – 11:15) • Frequency oscillations, incorrect ACE calculation • Communication failures and incorrect feedback loops
- Module 12: Workshop – AGC Incident Scenario (11:30 – 01:00) • Analyze and resolve a simulated AGC malfunction

Day 5: Advanced Applications and Grid Integration

- Module 13: AGC with Renewable Energy and Hybrid Systems (07:30 – 09:30) • Handling variable generation and fast-response resources • Integration with energy storage and DERs
- Module 14: Regulatory Trends and Grid Code Compliance (09:45 – 11:15) • GCC, EU, and North American AGC regulations • Compliance reporting and audits
- Module 15: Final Workshop – AGC Strategy Presentation (11:30 – 01:00) • Group presentation on AGC design and optimization for a sample grid

Certification

Participants will receive a Certificate of Completion in Automatic Generation Control, certifying their advanced skills in frequency regulation, control system tuning, and integration of AGC within power grid operations.

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Why Choose MAWA Events

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