EE149: SCADA/EMS for Power System Dispatch Center
Training Description:

The SCADA/EMS (Supervisory Control and Data Acquisition/Energy Management System), as we know it today had its origin in the need for electric utility companies to operate their generators as economically and securely as possible. The ample cost justification for this has been demonstrated many times. To operate the system as economically and securely as possible required that the characteristics of all generating units be available in one location so that the most efficient units could be dispatched properly along with the less efficient ones. In addition, there was a requirement that the on/off scheduling of generating units be done in an efficient manner as well.

The scheduling of Generators with limited fuel or water supplies were incorporated in energy management systems. This allows operators to further reduce the cost of operation by taking advantage of cheaper fuels. When operating within a vertically integrated electric utility - i.e. one which owns and operates the generation, transmission, and the distribution, the economic dispatch and scheduling of generation is usually done to minimize the total operating cost of generation. When the Electric System is unbundled, the economic dispatch and scheduling is done on the basis of prices bid to a central office.

These economic objectives, whether through central or market-based dispatch, need to be met with system security and reliability in mind. As a result, the entire technology of off-line and online security monitoring, assessment and enhancement need to be considered. The course will take the students through simple steps to understand the issues involved both during the lectures as well as during the hands-on exercises using the Operator Training Simulator.

Training Objectives:

By the end of the training, participants will be able to:

✓ Know the organization of functions for the Secure and Economic Operation/Control of the Power System
✓ Familiarize with the structure of the Hardware, Communication and Software System in SCADA/EMS Systems
✓ Know the fundamental Power System Principles for Power Flow Analysis, Generation and Voltage Control
✓ Learn how to run an advanced Power System Simulator with Control Center Functions
✓ Learn how to carry out Normal and Emergency Procedures using the Simulator as a Hand-on Training
✓ Learn the Individual and Team work in Solving Operation and Control Problems

Training Designed for:

This course is intended for Dispatchers in Control Room for Power System, Operation Engineers involved in preparing operation orders and Short-term plans, Power System Instructors responsible for Training of Operating Personnel on System Applications, and Operations & Control Managers, Engineers, and Supervisors.
Training Program:

DAY ONE:
❖ PRE-TEST
❖ Introduction
❖ SCADA for Power System
   • SCADA Definitions
   • Overview of SCADA System
   • Software Tools
   • SCADA System Engineering
   • Dispatch Center Typical Configuration
   • Symptoms of Harmonic Problems
   • Symptoms of Transient Problems
   • General Approach
❖ Functional Software Modules
   • Integrated hardware/Software Platform
   • Power Analysis Software
   • Dispatch Information Management System (DMIS)
   • Dispatcher Training Simulation System (DTS)
   • Tele-Meter Reading System (TMR)
   • Evolution of System Monitoring & Control

DAY TWO:
❖ SCADA Security Controls
   • Securing the Power System
   • Security Policy
   • New Technology for SCADA
   • SCADA to Corporate System
   • Substation Automation System
❖ Evolution and Functions of EMS
   • Role, Architecture and Applications of EMS
   • EMS in Fully Integrated Power Utility
   • The EMS under Deregulation and/or Restriction
   • The Independent System Operator
   • Communication and Data Interfaces for Modern EMS
   • Market Administration in Destructed Environment

DAY THREE:
❖ Power System Applications in EMS
   • State Estimation and Application
   • Short Term Load Forecasting and Application
   • Reliable Operation of the Power System
   • On-Line Voltage and Dynamic Stability Assessment
   • Optimal Power Flow
EMS Applications and Restructuring
- Unit Commitment Scheduling
- Automatic Generation Control
- Market Designs and ISO’s in Selected Regions
- Markets Based on Locational Marginal Pricing
- Congestion Management
- Ancillary Services and Settlements
- Open Access Requirements and Applications
- Automatic Generation Control Performance.
- Introduction to Risk Management in Electricity Markets
- Options and Futures in Electricity Market Trading

**DAY FOUR:**

Power System Operation & Optimization
- The Control Problems
- The Optimization Problems
- Generation Reserves
- Security Assessment
- Quality, Security and Economy
- Technical Fundamentals
- Graphic Description
- Indicators
- Measured Values
- Energy Management Systems

New EMS Philosophy in the Middle East
- Forward Market Administration
- Competitive Bidding in Generation Market
- Uncertainty and Risk in Day Ahead Markets
- Applications to the Middle East GCC Interconnection
- Discussion and Review

**DAY FIVE:**

Deployment of Smart Grid Technologies
- Lessons on Technology
- Implementation and Deployment
- Case Studies in Smart Grid
- Present and Future Integration of Diagnostic
- Accelerated Deployment of Smart Grid Technologies
- Present Scenario, Challenges and Way forward

Course Conclusion
- POST-TEST and EVALUATION
**Training Requirement:**

“Hand’s on practical sessions, equipment and software will be applied during the course if required and as per the client’s request”.

Please note that the above topics can be amended as per client’s learning needs and objectives. Further, it should be forwarded to us a month prior to the course dates.

**Training Methodology:**

This interactive training course includes the following training methodologies as a percentage of the total tuition hours:-

- **30%** Lectures, Concepts, Role Play
- **70%** Workshops & Work Presentations, Techniques, Based on Case Studies & Practical Exercises, Software & General Discussions
- Pre and Post Test

**Training Certificate(s):**

Internationally recognized certificate(s) will be issued to each participant who completed the course.

**Training Fees:**

As per the course location - This rate includes participant’s manual, hand-outs, buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

Note: The 5% VAT (Value Added Tax), will be effective starting 01st of January 2018 as per the new regulation from the UAE Government. The VAT applies for all quotation both for local and abroad.

**Training Timings:**

Daily Timings:
- 07:45 - 08:00  Morning Coffee / Tea
- 08:00 - 10:00  First Session
- 10:00 - 10:20  Recess (Coffee/Tea/Snacks)
- 10:20 - 12:20  Second Session
- 12:20 - 13:30  Recess (Prayer Break & Lunch)
- 13:30 - 15:00  Last Session

For training registrations or in-house enquiries, please contact:
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Training & Career Development Department