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SCADA Training - T&D Automation

Contact us Today for a FREE quotation to deliver this course at your company?s location.

https://www.electricityforum.com/onsite-training-rfq

This course covers all the major subassemblies of the T&D system, including modern high speed network communication, which is immune to EMI and transients. Our SCADA training course examines all T&D SCADA hardware requirements as well as software requirements, with the required qualifications. Typical examples of SCADA Systems and interoperation with the proper relay protection are provided.

WHO SHOULD ATTEND

- Electrical Power Engineers
- Control and Automation Engineers

- Instrumentation Engineers
- Electrical Technicians
- Managers working in the Power Automation Field

STUDENTS RECEIVE

course benefits

COURSE OUTLINE

DAY ONE

Introduction to Electrical Power Systems

- Electrical Power system classification
- Voltage Levels: Low Voltage; Medium Voltage and High Voltage Typical Systems
- Electrical power flow from Generation to the end user

Power Systems Architecture

- Typical structures for Low Voltage Electrical Systems
- Medium Voltage Substations; Switchgears and Switchyards
- Distribution and Transmission Substations
- High Voltage and Ultra High Voltage Substations
- Underground and Enclosed Substations
- Transmission Lines

Power System Protection types

- Electrical Power Generators Protections, requirements

- Substation Protection, requirement and configuration selection
- Transmission Line Protection Equipment, -Surge arrestors
- Power factor Correction, systems at the Generator; Substation and Transmission Lines
- Low voltage Systems Protection, Dynamic and Static Loads requirements
- Typical Fuse Protection and Circuit Breakers Protection
- Standards requirement for Electrical Protection
- Testing and calibrating Circuit breakers
- Commissioning of an Electrical Power Systems

Power Transformers

- Dry versus Oil Filled Power Transformers
- Distribution Transformers
- Power Transmission Transformers
- Transformer Winding Configuration
- On Line and Off Line TAP Changers
- Testing Electrical Transformers
- Maintenance of an Electrical Power Transformer
- Instrumentation related to Electrical Power Transformers Maintenance and Protection
- Typical Faults of Electrical transformers
- Electrical Transformer Aging and Maximum Load
- Paralleling Electrical Power Transformers

Power Switching Equipment and Structures

- Electrical Disconnect Switches,
- Low Voltage Circuit Breakers
- Medium Voltage Vacuum and Oil Breakers
- Medium Voltage Electrical Switchgear
- High Voltage SF6 and Vacuum Breakers
- Indicators of Degradation of a Medium and High Voltage Breakers
- Breaker Maintenance and testing
- Grounding and safety grounding

Local monitoring of Electrical power Systems

- Local Monitoring Integrated Relays
- Substation Bay Monitoring Systems, functions and Implementation
- Networks and communication systems
- Data Base and Trending of Local Parameters

Switchyard and Switchgear typical Execution Elements

- Switchgear and Switchyard Systems,
- PT and CT Types, location and requirements
- Motorized Breakers; Hydraulic Breakers
- Power Factor Capacitor Banks Connections
- Power Electronic Elements used in Substations

DAY TWO

Remote Connectivity and Networks for Transmission Lines

- Typical Configuration for Information Transmission
- Switches; and Routers requirements to be used in Electrical Power;
- Data Protection and Encryption, CISCO Routers
- Data Transmission Capability of most representative Networks used in power systems
- Backup Systems and redundancy required for Data transmission
- RTU – Radio Capability Example
- Wi-Fi and GPS usage and integration
- Tendency and Development – National Instruments & LAB View for SMART GRID

SCADA Solutions and Principles of Operation

- SCADA System Functions
- Power Generation Station typical SCADA Solution
- Active and Reactive Power Control in a Power Generation Station
- Typical Topology of a SCADA SYSTEM Implemented for a Substation
- Operation of a SCADA System in a Substation
- Load Shedding and fault mitigation for a Substation using SCADA
- Power Factor Correction in a Substation using SCADA
- Transmission lines Supervised by SCADA Systems

SCADA System Architecture-a Practical approach

- Example of a complete Networking System
- Network Topology and Architecture
- Implementation Example of a Substation SCADA
- Implementation of a SCADA System in a Nuclear Plant

Modern Implementation of the Power System Protection

- Integrated Protection Systems for a Power Generator
- Integrated Protection Systems for Backup Generators and Groups of Backup generators
- Integrated Protection Solution for Power Transformers and Feeders
- Integrated Protection Systems for Substations
- Modern Implementation of a Protection, based on the Integrated Systems and Real time Networks and Communication
- Manufacturers Integrated Protection Systems

Consideration of the Power System Networking Solutions

- Real Time Networking Solutions
- Main Topology and Parameters of Real time Networks
- Protocol Converters and Universal Convertors

Servers and Backup back up Power Monitoring

- Server architecture and data organisation
- Automatic Backup of vital field data
- Restoring the Data after Power Failure
- UPS and ATS Requirements in a Centralized SCADA System
- Redundancy Level Required in a SCADA System

Monitoring remotely the Power System

- Example of sequence of Events in a Substation Equipped with SCADA, in case of a remote Fault
- Sequence of Events of a SCADA Controlled System in case Power Factor Correction is required
- Large Electrical Grid Voltage Compensation via SCADA System
- Electrical Power Generator VAR correction based on Load Change

Building OPC & ODBC Connectivity

- OPS Server For Connectivity
- ODBC to OPC Link for data transfer
- Examples of utilisation of OPC & ODBC connector in SCADA System Data Flow

SCADA Control System and Parameters

- Typical Parameters Monitored by a SCADA System in a Generation Plant, monitoring

and control solutions
- Monitoring and controlling Substation Parameters remotely, example of data flow and parameters
- SCADA Monitoring for Large Electrical System
- Energy Stability and optimization
- Power management solution
- Intelligent Load Shading and preservation of important Loads
- Simulation and Predictability of Events
- Reconstruction of previous events using Historian
- SCADA Systems Hierarchy and Interaction: Power Generation; Substation Transmission and Distribution Lines

COURSE TIMETABLE

Both days:
Start: 8:00 a.m.
Coffee Break: 10:00 a.m.
Lunch: 12:00 noon
Restart: 1:15 p.m.
Finish: 4:30 p.m.