

GE Energy Management

**PowerOn Reliance
Training Course
Catalog**



Growth through Knowledge



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General Information

Introduction

The POWERON RELIANCE Technical Training Program offers unique and comprehensive courses developed specifically to support the **POWERON RELIANCE Energy Management System** software system, applications, and user interface. Courses are designed to meet the total needs of our customers including: software maintenance and enhancement, system development, system administration, database and display maintenance, end user applications, and operator monitoring and control of the power system.

Staff

A team of full-time professional instructors and product engineers is available for the delivery of technical training. Instructors specialize in course development and technical instruction and work closely with software engineers to actively maintain the courses they present. This approach ensures that courses are accurate and up-to-date in all areas. Additionally, our instructors are involved in the design and development of new courses, bringing you information on recent product advancements and areas of customer interest.

Course Development

The POWERON RELIANCE curriculum is developed using the *ADDIE* training development model. Courses are designed to assist customers in expanding their knowledge of POWERON RELIANCE applications and to optimize their practical use of the software, thereby gaining the best value for their business investment.

Course Assessments

Knowledge assessments (e.g. quiz, exam, tutorial, etc.) are included in the courses to help track the participants' progress. Quizzes and exams are reviewed for the purpose of reemphasizing the highlights of the course and to allow participants the opportunity to gauge their comprehension. This allows participants to clear up any remaining questions or lack of understanding pertaining to the material covered. Several of the courses are awarded CEH (continuing education hours) and are NERC certified courses. Course certificates are awarded upon successful completion of each training course.

Class Schedule

Classes begin at 8:30 a.m. and continue until 4:00 p.m. (starting days and course durations vary among courses, so please check the current course schedule for details). Courses typically have two scheduled breaks and a break for lunch. Most courses end by mid-afternoon on the final class day to allow for departures and travel.

Language of Instruction

English is the standard language of instruction for all classes, both in Melbourne, FL and at the customer site. For classes in any other language, an interpreter must be provided and course customization charges will apply. Customers with language translation requirements should contact GE Training Department.

Technical Training Center

The Technical Training Center, in **Melbourne, Florida (USA)**, is a dedicated facility located at 1990 NASA Blvd. Melbourne, FL USA. The Training Center is designed specifically for the delivery of technical training courses. Each classroom comfortably accommodates 10 to 12 participants. All classrooms are equipped with overhead projectors, white boards and audiovisual capabilities. A primary goal of each training course is to offer participants an interactive learning experience. Therefore, computers are distributed throughout the classrooms for instructor demonstrations, hands-on exercises, and participant use. A light breakfast and afternoon snack is served. Alternate food choices are also available in the resident cafeteria. Additionally, a wide variety of restaurants are located in the vicinity of GE Melbourne.

HealthAhead

HealthAhead is a GE company-wide health initiative designed to create a world-class culture of health. One element of **HealthAhead** is tobacco cessation across all GE properties. We are pleased to inform you that the GE Melbourne facility, including the Training Center, is a tobacco free campus. All tobacco use, including but not limited to smoking, dipping, chewing, e-cigarettes, etc. is prohibited at GE, including all indoor and outdoor space on the GE property. All employees, contractors, and visitors are asked to refrain from using tobacco products anywhere on our campus. We thank you in advance for your cooperation with our tobacco free policy.

Customer Site Training

Customers may request that many of the technical training courses be taught at their site. Customer site (also called "on-site") courses do not require a minimum number of participants, however, it is recommended that customers have at least four participants scheduled for attendance to host an onsite course. We provide an expert instructor and all necessary training documents. Customers are responsible for providing adequate equipment and facilities, including but not limited to: sufficient hardware, student workstations, appropriate software, software licenses, projection equipment, whiteboards and markers, flip charts, etc. Please contact the GE Training Department to arrange for customer site training delivery.

Course Registration and Contact Information

Registration requests should be submitted to the Training Center no later than 15 business days prior to the scheduled begin date of any class. To ensure adequate access to the laboratory equipment, enrollment in many of the classes is limited. Seating for classes is reserved in the order that requests are received.

If online registration is not convenient, the registration form located in this document, may be faxed or mailed to the Technical Training Center. You may also contact the GE Melbourne Training Group at **(321) 435-5100** to make special training requests or to get more information.

Cancellation Policy

- GE may cancel classes with less than the minimum of four (4) registered students, no less than two weeks prior to the scheduled start of that class. Any enrolled students would be notified of the cancellation and optionally rescheduled for a later offering.
- Customer cancellation of student enrollments received less than two weeks prior to the start of the class will be subject to a cancellation fee equal to 50% of the tuition. If an enrolled student fails to appear for a scheduled class, a cancellation fee equal to 100% of the tuition will be charged.

Training Course Registration Form

Complete this form and return to:

GE Melbourne
1990 West NASA Blvd.
Melbourne, Florida 32904
Attn: Customer Training
Ph: (321) 435-5100

Name: _____

Company: _____

Address: _____

City

State

ZIP

Telephone: () _____

E-Mail Address: _____

Course Name: _____

Course Date: _____

Participant Name(s): _____

Method of Payment:

Purchase Order # _____ Please send a copy of PO with registration

Credit Card: **MC** _____ or **VISA** _____ → Credit Card payments require a special **Credit Card Information Form** to be completed and returned with the Registration. Please email or call to inquire.

Melbourne Area

Hotel Accommodations

Listed below are some of the hotel properties in the Melbourne area:

Radisson Suites Oceanfront	(321) 773-9260	Crown Plaza Oceanfront	(321) 777-4100
Melbourne Hilton Rialto	(321) 768-0200	Doubletree Guest Suites Melbourne Beach Oceanfront	(321) 723-4222
Hilton Melbourne Beach	(321) 777-5000	Courtyard by Marriott	(321) 724-6400
Hilton Cocoa Beach Oceanfront	(321) 799-0003	Extended Stay Deluxe (Airport)	(321) 733-6050
Suburban Lodge (Airport)	(321) 768-9777	Hampton Inn (I95)	(321) 956-6200

Local Transportation

A variety of conveniently scheduled flights are available daily into the Melbourne International Airport (MLB) or nearby Orlando International Airport (MCO).

Public transportation in the Melbourne area is limited. Car rental is recommended for those attending classes at the GE facility. Car rentals are readily available from national agencies at either the Melbourne or Orlando airports.

Special arrangements can be made with local transportation companies (taxi, van, car service) for participants without driver's licenses.

Visitors' Information

Melbourne Florida is home to several historic villages and neighborhoods, fine shopping, and diverse dining. Additionally, there are many opportunities for "fun in the sun" such as: fishing, sailing, golfing, tennis, surfing, hiking, beach play, and airboat rides just to name a few.

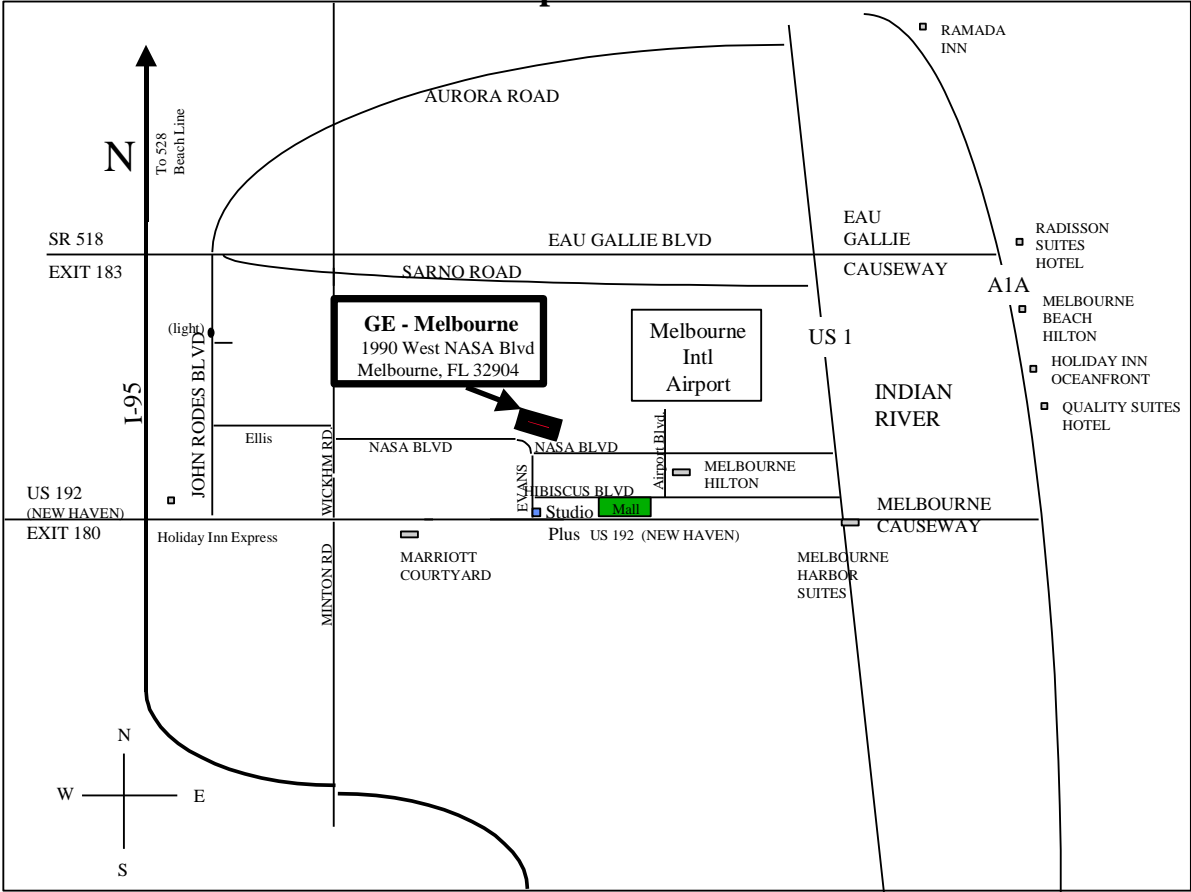
Melbourne International Airport (MLB) is an approximately a 10 minute drive from the Atlantic Ocean, one mile from the Intra-Coastal Waterway and an easy drive to Port Canaveral Cruises, the Kennedy Space Center, Sebastian Inlet State Park and many wildlife refuges and preserves. Orlando, Disney, Universal Studios, Sea-World and other popular attractions are a one-hour drive from the Melbourne area.

Melbourne Area Map

The **GE Melbourne Customer Training Facility** is located at **1990 West NASA Boulevard** (in the main GE Melbourne office), just west of the Melbourne Airport.

General Directions: From Orlando International Airport, take Toll Road 528 (Beach Line Expressway) East to Interstate I-95. Go South towards Melbourne, FL. Exit East on Hwy. 192 (W. New Haven Blvd). Turn left on Evans Road (just west of the Melbourne Square Mall) and proceed to **1990 West NASA Boulevard**.

Local Map to GE - Melbourne



FROM ORLANDO AIRPORT TAKE State Road 528 East to I-95 South

Training Plans

POWERON RELIANCE Energy Management Systems Training Courses are arranged into the following categories based on common **roles and responsibilities** of the typical electrical power utility business. This organization is offered as a guideline to assist customers in selecting the best training plan for their employee, thereby providing a value added approach.

System Orientation – System overview and software architecture courses; The System Overview course is primarily for Project Managers, Senior Management, and Administrative support personnel who require a comprehensive high-level overview of the POWERON RELIANCE system. The Software Architecture course is designed for the system administration and support staff.

Database and Display Engineers – Technical classes that teach how to edit and maintain a POWERON RELIANCE database and build graphical displays.

Software Developers/Engineers – Software intensive courses for staff who will be maintaining and enhancing POWERON RELIANCE software at the customer site, such as software developers, engineers and programmers.

System Administrators and Communications Engineers – Technical instruction focused on the administrative duties required for the EnterNet Suite applications and the configuration, administration, and use of the ICCP (Inter-Control Center Protocol) software application.

Power Systems – Power Systems Engineering courses focus on the power systems applications (Network Analysis and Generation Dispatch and Control) of POWERON RELIANCE.

End Users – Operator/Dispatcher training typically performed at the customer's site after Final Acceptance Testing (FAT).

Workshops – Workshops span a variety of topics and are developed based on customer specific requirements. Workshops are not part of the standard POWERON RELIANCE course schedule and are priced based on requirements and necessary preparation. Workshops require special scheduling arrangements and may be delivered either at the customer site or the Technical Training Center

A few of the POWERON RELIANCE training courses are offered in two parts.

- **Part I** courses are considered basic or fundamental for understanding of the POWERON RELIANCE system and are highly recommended for each member of the customer team who will be involved in implementing and supporting the POWERON RELIANCE system (as appropriate based on roles and responsibilities).
- **Additional (Part II)** courses target specific technical areas of various software applications. Each additional course has a prerequisite *Basic Course* that must be completed prior to attendance in the **Part II Course**. Part II courses may not be necessary for all members of the customer team.

The following pages contain course durations, prerequisites, descriptions, and course objectives for the technical training courses offered by GE Melbourne Technical Training Center.

Course Descriptions

System Orientation Courses

These courses are designed to provide an overview of the POWERON RELIANCE system and software architecture.

System Overview

Duration

1 - 2 Days as needed

Prerequisites

None

Description

This course provides students with a high-level comprehensive overview of the POWERON RELIANCE System. The system is logically broken down and studied from a functional viewpoint, using block diagrams of both hardware and software, and hands-on demonstrations to illuminate discussions. Each function's capabilities are explored to achieve understanding of what the system can do and how to apply its applications. Standard documentation is discussed as the roadmap to follow-on training for the POWERON RELIANCE system. This course is typically taught onsite as a preliminary overview of the POWERON RELIANCE System.

Objectives

Upon completion of the course, the participant will be able to:

- Use and understand POWERON RELIANCE terminology
- Identify the major subsystems and their capabilities within POWERON RELIANCE
- Understand the distribution of the system data and identify where functions reside
- Find documents on a given topic

Software Architecture

Duration

3 Days

Prerequisites

Unix® Fundamentals

Windows® Fundamentals

Description

The purpose of this course is to provide a detailed introduction of the architecture of the POWERON RELIANCE system. Software subsystems are broken down and discussed at a program level. This course serves as the foundation for the remainder of the courses offered by the GE Technical Training Center. The course is designed for participants who will be modifying, maintaining and supporting the POWERON RELIANCE system software. External interfaces such as hardware and user interactions are illustrated through lab demonstrations to further aid understanding.

Objectives

Upon completion of the course, the participant will be able to:

- Describe the overall functionality of the POWERON RELIANCE System
- Describe the functions of the POWERON RELIANCE subsystems (functional components) and of the POWERON RELIANCE System
- Describe the POWERON RELIANCE environment in terms of functional and physical nodes
- Determine a given program's subsystem and function
- Describe program interactions within various subsystems
- Identify the users of various database elements
- Identify the directory paths for source, header, configuration, and data files

POWERON RELIANCE Database and Display Courses

These courses are recommended for support staff that will be configuring and maintaining the POWERON RELIANCE database and building or maintaining system displays. These classes are usually needed early in the standard POWERON RELIANCE training course sequence, thus preparing customers to configure, build and maintain their own database and displays.

Database Editor

Duration - 4 Days

Prerequisites

Software Architecture for POWERON RELIANCE
Unix Fundamentals
SQL Basics

Description

The course provides instruction on creating, and maintaining data within the POWERON RELIANCE relational database. The course introduces the organization of the logical database and presents the concept of a relational database view. The attendees will learn to perform editing operations using the RELIANCE Database Editor and will also learn the process to perform bulk data loads. Participants use standard database batch files to construct their own batch files. The presentation also encompasses utility support programs related to database maintenance and file integrity. Various database views are examined to identify the structure of the editing system and its related functional interfaces. Examples used in this course are primarily related to the SCADA components of the system, however, the principles and concepts gained from this course can be applied to advanced applications.

The second half of the course focuses on the database views required to configure SCADA telemetry devices, particularly RTUs, and associated point data. Students will perform a comprehensive hands-on tutorial in which an RTU and its supporting devices and data are configured in the POWERON RELIANCE training Database environment.

Objectives

Upon completion of the course, the participant will be able to:

- Demonstrate familiarity with POWERON RELIANCE database terminology
- Identify and describe standard database views
- Initialize and use a database editor session to enter new data into the database
- Efficiently use both interactive and batch editing processes
- Demonstrate the use of the database editor search techniques
- Identify the database views required to define SCADA telemetry devices such as RTUs and associated analog, status, and accumulator point data.
- Configure an RTU and related database items in the training environment
- View the newly defined RTU and related telemetry points via the standard dynamic data display

Display Editor

Duration

4 Days

Prerequisites

Software Architecture
Basic Familiarity with ACAD

Description

The Display Editor (with AutoCAD) course provides instruction to design and implement user interface displays representative of a power control center's energy management, generation, and transmission networks. The focus is based on AutoCAD features applicable to the system displays for power control centers. Dialog boxes, devices, AutoCAD to display layer/page mapping, layer control, overlays and de-clutter are many of the features addressed. Using a step-by-step tutorial, the student will go through the processes necessary to build a typical SCADA energy management one-line display and a dynamic, high-level overview display. Display design concepts and specific display building techniques are reviewed and discussed. Creation of representative displays is incorporated into the course to enhance the student's comprehension of the material. This course also incorporates a discussion and hands-on practice of the installation of the Display Build Facility (DBF) software required to run ACAD in the POWERON RELIANCE environment.

Objectives

Upon completion of this course, the participant will be able to:

- Build representative energy management displays
- Identify and utilize the various display tools available for creating page based, world based, and list based displays
- Create system overview displays
- Modify existing displays
- Create commonly used electrical devices and display dynamic cross references
- Recognize and verify the standard AutoCAD features supported in the POWERON RELIANCE environment
- Run and utilize various POWERON RELIANCE tools available for viewing the contents of the device and runtime displays
- Install the Display Build Facility (DBF) software
- Verify the functionality of the Display Build Facility (DBF) software with ACAD
- Recognize and verify the standard AutoCAD features supported in the POWERON RELIANCE environment
- Run various POWERON RELIANCE tools available for viewing the contents of the device and runtime displays

POWERON RELIANCE Software Courses

These courses are recommended for staff that support and manage software applications for the POWERON RELIANCE system, as well as those personnel responsible for supporting applications that require user interaction with data definitions. Some courses require prerequisite knowledge, including Unix Fundamentals, SQL, and C Programming.

Software Tools & Utilities

Duration

4 Days

Prerequisites

UNIX, Software Architecture for POWERON RELIANCE

Description

This class presents the fundamental tools and utilities used to manage and make adjustments to POWERON RELIANCE software. Topics include: system start-up procedures; node restarts; cparm and opchar entry modifications; database saves across cold starts (memos, tags, manual entries); disturbance data archives and transfers; Load Shed group and control point definition; Logical Display Reference list conversion; debugging files and methods.

Objectives

Upon completion of the course, the participant will be able to:

- Define the entries for the system configuration file used at POWERON RELIANCE system start-up
- Determine and make changes to the operational characteristics (OPCHAR) of system executables
- Determine and make changes to the values of the current configurable parameter (CPARM) entries
- List which programs are included in the system initialization list (ILIST) entries
- Determine which system files will be distributed to configured nodes at system start-up
- Determine which database files will be distributed to each node at database initialization
- Locate the directories and files used for system base history and database editor history
- Define and use Sequential Control
- Use debug to trace system software problems
- Define a disturbance data trigger
- Define a disturbance data transfer set
- Define a load shed group
- Define a load shed control point
- Logical Display Reference list

Historical Data Collections and Time Series Builder

Duration

Historical Data Collections - 2 Days

Time Series Builder – 1 Day

Prerequisites

Software Architecture for POWERON RELIANCE

Database Editor

Oracle® SQL Basics

Description

The Historical Data Collections course offers instruction and hands-on exercises for engineering staff that maintain and use the Oracle based POWERON RELIANCE Historical Database Subsystem. Topics discussed encompass the following; the Historical Database Subsystem Architecture, User Interface, Data Management, Collection Schedules for Aggregate Data, Data Processing for Simple Point Collections, Data Retention, Truncation and Archiving. This course includes discussion and hands-on practice for using the Time Series Builder (TSB) feature for historical data forms and reports application development.

Objectives

Upon completion of this course students will be able to:

- Define Historical Subsystem tables and views using PL/SQL
- Enter and manage table definitions via the Historical Administration Form
- Use the database editor to establish and manage Collection Schedules for aggregate data
- Use text files to establish and manage Collections for non-aggregate point data
- Archive data from the Historical Subsystem to off-line storage
- Establish and monitor Retention and Truncation processing on Historical Data
- Describe the functions of the Time Series builder
- Create builder templates
- Integrate builder templates and historical data into Time Series applications
- Manage builder templates using the development tool

Real Time Data Calculations

Duration

2 Days

Prerequisites

Software Architecture for POWERON RELIANCE
Database Maintenance - Basic
Unix
C Language Programming

Description

The Real Time Calculations course provides instruction and hands-on exercises for engineering staff that maintains and uses the POWERON RELIANCE Real-Time Data Calculations Subsystem. Topics discussed include the Subsystem Architecture, Application Processes, User Interface, Real-Time Calculations database definitions, Standard and Custom Calculation functions and related macros and library calls.

Objectives

Upon completion of this course students will be able to:

- Explain the application processes required for RTC
- Use database editor to establish and manage I/O Set and Version definitions
- Apply standard calculation functions, macros and library calls for real-time calculation processing.
- Write custom calculation functions in C-language
- Use the required scripts for compiling and adding new calculation functions to the executable library
- Understand and apply quality propagation rules to custom calculation functions
- Locate and understand configuration entries used for this subsystem

Program Development for POWERON RELIANCE

Duration

10 Days

Prerequisites

UNIX; C Programming; Software Architecture; Software Tools and Utilities

Description

This course provides in-depth emphasis on the subsystems and interfaces useful for programming on the POWERON RELIANCE system. Topics for discussion include system environment variables, implementation of makefiles, system base services (Portable Application Interfaces), System Communication Subsystem (SCS), program integration and in-line debugging macros. Additionally, writing interfaces to Distributed Graphics, Database Access, and Alarm/Events is included in the programming techniques discussed. Various C programming language projects are assigned to utilize the interfaces to these subsystems; an on-line development system is provided for program testing.

Objectives

Upon completion of this course, the participant will be able to:

- Identify design conventions of standard POWERON RELIANCE level programs
- Write specific code to utilize various system services and library routines
- Execute system utilities that aid the programmer with implementation and development of programs
- Identify the characteristics of system programs and the techniques needed to add or modify additional programs
- Schedule and/or abort real-time programs, as well as query a program's status
- Write code that utilizes database access routines, including alarm/event interfacing
- Write a data collection routine that interfaces with a system graphic display

System Administration & Communication Courses

These classes address administrative duties required to configure the EnterNet Suite User Interface applications, maintain several of the Oracle based POWERON RELIANCE functions and the set-up and use of the ICCP communications protocol.

EnterNet Suite Administration

Duration

2 Days

Prerequisites

POWERON RELIANCE System Overview or
Software Architecture

Description

This course is designed to teach the configuration and administration functions of the POWERON RELIANCE EnterNet Suite User Interface. Hands-on exercises are used to learn and practice the configurable components of the ES UI.

Objectives:

Upon completion of the course, the participant will be able to:

- List the possible configuration options of the EnterNet Suite agent and server (single vs. multiple node).
- List the steps required to install the agent and server in the desired node configuration.
- List the steps to install the Java software if required.
- List the steps to install the Java WebStart software if required.
- List the steps to install the EnterNet Suite client on a PC.
- Perform administration functions to add, modify, and delete control and view-only users.

Inter-Control Center Communications Protocol (ICCP)

Duration

2 Days

Prerequisites

UNIX or Linux Fundamentals

Description

This course provides information and hands-on exercises that will enable the student to understand ICCP associations and define them in a POWERON RELIANCE system. Students will discuss the configuration of the POWERON RELIANCE ICCP software and datalink transfers.

The class includes an overview of the TASE.2/ICCP and MMS standards, an explanation of the mapping between TASE.2 objects, and the POWERON RELIANCE database; procedures to configure the ISO network software; procedure to populate the POWERON RELIANCE database for ICCP associations; and the actual transfer of data between two (fictional) control centers. The class will enable Engineering/ Programming staff to configure the POWERON RELIANCE system ICCP software and to initialize and use the ICCP datalink.

Objectives

Upon completion of this course, the participant will be able to:

- * Define the essentials of bilateral table agreements
- * Define the relationship of ICCP and TASE.2 (IEC) standards to MMS
- * Define the relationship between ICCP objects and POWERON RELIANCE database entities
- * Identify and define ICCP Block transfers between control centers
- * Configure the POWERON RELIANCE database and OSI stack to accomplish an ICCP transfer
- * Describe the OSI layers of the network protocol
- * Configure ISO network software
- * Determine the type of block (1-9) required for a specific transfer task
- * View the results of a block transfer
- * Add and delete ICCP transfer sets
- * Use the ICCP Administration Utility to start and stop transfers
- * Examine Data Link Logs to view datalink historical activity

Power Systems Engineering Courses

The following Power Systems Engineering courses are intended for Power Systems Engineering staff. Course discussions include theory on power engineering topics plus hands-on exercises for the POWERON RELIANCE Power Systems applications.

Generation Dispatch & Control (GDC) – Part I

Duration

3 Days

Prerequisites

Knowledge of power systems operations is desirable

Description

This course gives an overview of the theory, function and use of the GDC subsystem software. Discussion topics include:

- Automatic Generation Control, (AGC)
- Generation Dispatch,
- Reserve Monitoring,
- AGC Performance Monitoring and NERC Reporting,
- Production Costing and Reporting,
- System and Unit Tuning and Response Testing,

Objectives

Upon completion of this course, the participant will be able to:

- Identify the functions of the principle GDC component programs
- Identify the input variables to the Area Control Error (ACE)
- List the control modes for generating units and describe the impact of the control mode on Generation Dispatch
- Perform mode changes for system and unit components via GDC display interaction

Hands-on lab experience reinforces the topics discussed in class.

Generation Dispatch & Control (GDC) – Part II

Duration

2 Days

Prerequisites

GDC – Part I course

Knowledge of power systems operations is desirable

Description

This course gives an overview of the theory, function and use of the GDC subsystem software.

Discussion topics include:

- Interchange Scheduling, (IS)
- Inadvertent Reporting,
- Load Forecasting (SDF or DF),
- Unit Commitment/Transaction Evaluation, (UC/TE)
- Comprehensive Operational Planning and Scheduling (COPS) including:
 - Optimization and constraints (Fuels, Emissions, Hydro)
 - Long Term Planning and Analysis Functions

Objectives:

Upon completion of this course, the participant will be able to:

- Identify input functions for Interchange Scheduling
- Identify the interfaces for Load Forecasting
- Identify the major functions associated with the Unit Commitment/Transaction Evaluation
- Identify the major functions associated with the Comprehensive Operational Planning and Scheduling

Hands-on lab experience reinforces the topics discussed in class.

Transmission Security Management (TSM) – Part I

Duration

3 Days

Prerequisites

Knowledge of power systems operation is desirable

Description

This course gives an overview of the theory and use of the TSM subsystem software.

Discussion topics include:

- Network Modeling
- TSM Subsystem Architecture
- Network Configuration
- State Estimation
- Power Flow
- Contingency Analysis

Objectives

Upon completion of this course, the participant will be able to:

- Identify the functions of the principle TSM component programs
- Run Real-Time Network Analysis and identify violations
- Initialize a Study Case and run Study Network Analysis with hypothetical situations such as generating unit outages)
- Run Real-Time and Study Contingency Analysis and call up the resulting displays to determine current and potential network problems
- Store case studies for future retrieval and analysis

Hands-on lab experience reinforces the topics discussed in class.

Transmission Security Management (TSM) – Part II

Duration

2 Days

Prerequisites

TSM - Part I Course

Knowledge of power systems operation is desirable

Description

This course gives an overview of the theory and use of the TSM subsystem software. Discussion topics include:

- Security Constrained Dispatch
- Voltage/VAR Scheduling
- Remedial/Preventative Action
- Fault Level Analysis

Objectives:

Upon completion of this course, the participant will be able to:

- Use Real-Time and Study Optimization Functions to develop plans for meeting specific operating objectives, subject to system constraints
- Use Real-Time and Study Remedial/Preventative Action functions to develop plans for minimizing the effects of harmful contingencies on the power system

Hands-on lab experience reinforces the topics discussed in class.

TSM Advanced Apps - Special Topics

- See Workshops section below for details.

End User Courses

These courses are typically conducted at the customer site. Each control room operator is preferably trained at a single workstation, thus allowing for maximum hands on exposure during the training session. **NERC CEH** (Continuing Education Hours) may be awarded upon successful completion for the End User/Operator courses. If you wish to purchase and arrange for the NERC CEH option please contact the Training Department at the GE Melbourne Training Center (321-435-5100).

SCADA Operator

Duration

2 Days per session or 2.5 days per session with NERC CEH Option

Prerequisites

Basic knowledge of local operating requirements, constraints, and procedures of control systems is necessary. It is suggested that this course be offered prior to commissioning the system. We highly recommend 1 student per workstation, depending on customer requirements.

Description

This course is designed to teach control room operations staff the operation and use of the SCADA features of an POWERON RELIANCE workstation using the Graphical User Interface (GUI) Application specific to the customer (X®-Windows Motif® or EnterNet Control). Training is at a customer site on customer workstations This course is instructed using extensive hands-on exercises.

Objectives

Upon completion of the course, the participant will be able to:

- * Call up SCADA displays in various ways
- * Set-up the display screen in a desired configuration, in order to view several displays in separate Viewports
- * Perform status point selection and device control
- * Perform analog point selection and data entry
- * Perform tag placement, modification, and deletion
- * Display summary information of alarms, abnormal conditions, and tagged points
- * Acknowledge and delete alarms
- * Assign data points to video trend variables

Transmission Security Management (TSM) Operator

Duration

2.5 Days per session or 3 days per session with NERC CEH Option

Prerequisites:

SCADA Operator Training

Description

This course identifies all functions related to Transmission Security Management (TSM) Operations, Equipment Outage Scheduler (EOS), and Network Status Processor (NSP). The course gives a hands-on overview of the functionality, capabilities, and utilization of those functions.

Hands-on lab exercises and demonstrations are included to reinforce the topics covered in class.

Objectives

- * Identify the principle TSM, NSP and EOS functions
- * Identify different modes of TSM operation
- * Interpret State Estimator outputs
- * Set up and analyze present and postulated system operating conditions
- * Perform "what if" study
- * Identify the schedule of power controls that optimizes a specified objective while simultaneously satisfying system operating constraints for a study case
- * Identify the strategy for responding to the occurrence of a contingency for a study case
- * Identify a list of actions to prevent the hazardous conditions in the event that the contingency case becomes reality for a study case
- * Interpret TSM outputs
- * Operate TSM displays
- * Interpret NSP outputs

Generation Dispatch & Control (GDC) Operator

Duration

2.5 Days per session

Prerequisites

SCADA Operator Training

Description

This course identifies all the Power System Analysis functions related to Generation Dispatch and Control (GDC) and Interchange Scheduling (I/S) operations. It gives a hands-on overview of the functionality, capabilities, and utilization of those functions.

Hands-on lab exercises and demonstrations are included to reinforce the topics covered in class.

Objectives

- * Identify the principle GDC functions
- * Identify the input components to the Area Control Error
- * List the unit control modes for generating units and the impact of the control mode on the Generation Dispatch
- * Perform AGC Tuning and Unit Response Testing
- * Identify the reserve categories
- * Identify the principle interchange schedule components
- * Enter interchange schedule through the I/S user interface

Dispatcher/Operator Training Simulator (DTS/OTS)

Duration

3 Days per session

Prerequisites

SCADA Operator
TSM Operator or GDC Operator
Generation Dispatch & Control – GDC Part I
Transmission Security Management – TSM Part I

Description

The participants will learn the functions of the Dispatcher/Operator Training Simulator to train other operators in a real-time simulation of an energy control center's daily environment. Engineers will become versed in the instructor-simulator interface and the procedures involved in the set-up and execution of a model simulation.

Objectives

Upon completion of the course, the participant will be able to:

- * Set-up a simulation scenario and to initialize the simulation
- * Store scenarios for future simulation sessions
- * Demonstrate the use of the instructor interface to simulate system conditions and disturbances
- * Set-up a list of events (generator outages, breaker changes of state, etc.) to occur during a training simulation session according to a specified time schedule or conditional events
- * Demonstrate basic skills and knowledge necessary to use the DTS system for training dispatchers for both normal and emergency operating conditions, planning for scheduled equipment outages and planning, emulating, and training for future system scenario

Workshops

Workshops are designed based on customer specific requirements and are not part of the standard POWERON RELIANCE course schedule. Workshops are priced based on specific delivery requirements. Necessary preparations must be arranged by special request. Workshops are priced at a special rate and are not a standard course delivery.

ClearCase® for POWERON RELIANCE

This workshop introduces ClearCase® for use in the PowerOn Reliance environment. Topics include the following:

- Browsing source tree within ClearCase®
- Modifying files in a ClearCase environment
- Minor administrative tasks
- MultiSite features
- VOBs, views, configSpecs
- Elements, branches, versions, labels
- MultiSite mastership and packets

Database and Display Workshops

Custom delivery for each customer based on the legacy data.

Refresher Training for Effective use of POWERON RELIANCE

The Refresher Training Workshop is intended for existing customers who have the need for refresher training in various areas of the Reliance system. Course content is highly customized as it provides students with hands-on training of the applications based on the customer's specific needs. An instructor will consult with the customer to determine the curriculum to be included in the workshop. Topics and content may be used from existing courses or new content may be developed. Course duration will be determined based on the customer's needs and a mutually agreed upon curriculum for the delivery.

Secure System Management

This workshop is intended for systems support staff who manage, maintain and support the PowerOn Reliance system. Topics include Centralized User Management, SUDO fundamentals, SUDO trouble shooting, system administration tips & tools, and effective use of PuTTY.

TSM Special Topics

Advanced Power Systems Applications for Power Systems Engineers; Topics include:

- State Estimator Tuning
- TSM Program Constants
- TSM Model Convergence Debugging
- TSM Tools & Diagnostics
- TSM Database Maintenance
- TSM Schedules & Updates

Upgrade Training

Content focuses on the product changes and new features from your previous/current release to the new/upgraded release that will be implemented.

NOTE: Workshops may be taught at the customer site or at the GE Training Center. Please contact the Technical Training Center to arrange the delivery of a Workshop.

Training Materials

Training materials are specifically developed for POWERON RELIANCE training courses and are made available to each student while in attendance at training courses. Materials include; reference documents such as the subsystem User's Guide, Software Description Manuals, and a Student Notebook containing supplemental instructional materials, related exercises and tutorials, and relevant presentation materials. The contents of POWERON RELIANCE training materials are confidential and proprietary and usage is protected by GE copyright.

Prerequisite Subject Matter

Following is a list of topics and subject matter that is considered prerequisite knowledge for various POWERON RELIANCE technical training courses and workshops described in this catalog.

Please note that these courses will not appear on the POWERON RELIANCE course schedule.

- Unix or Linux Fundamentals
- Networking Fundamentals
- C Programming Language
- Java Programming Language
- Oracle Database Administration
- Oracle System Administration

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