Course Description Guide
Disclaimer of Liability

This document has undergone extensive technical review before being released. We review this document at regular intervals, and include needed corrections in the next release. While every effort has been made to keep the information herein as accurate and up to date as possible, Siemens Energy, Inc. assumes no responsibility for errors or omissions or for damages resulting from the use of the information contained herein. Your suggestions are welcome.

The contents of this manual are subject to change without prior notice.

Copyright © Siemens AG 2012. All rights reserved.

The reproduction, transmission or use of this document or its contents is not permitted without express written authority. All rights are reserved. Offenders will be liable for damages.

Registered Trademarks:

Spectrum Power®, SICAM®, SINAUT®, SIMATIC® and SINEC® are registered trademarks of Siemens AG.
# Table of Contents

Course Description Guide ..............................................................................................................................................1
Table of Contents .......................................................................................................................................................3
Spectrum Power 3 ...................................................................................................................................................... 5
  Spectrum Power 3 Application Data Viewer .................................................................................................6
  Spectrum Power 3 Basic Data Processing SWD .............................................................................................7
  Spectrum Power 3 Communication Front End ...............................................................................................8
  Spectrum Power 3 Data Modeling ...................................................................................................................9
  Spectrum Power 3 Database Maintenance ......................................................................................................10
  Spectrum Power 3 Display Building ................................................................................................................11
DNP3 - Introduction to SCADA Communication ..................................................................................................12
Spectrum Power 3 Hardware Overview ...............................................................................................................13
Spectrum Power 3 Historical & Future Data Mgt SWD ......................................................................................14
Spectrum Power 3 ICCP Software Details .........................................................................................................15
ICCPNT Configuration and Operation ..................................................................................................................16
Spectrum Power 3 Installation & Administration .............................................................................................17
Spectrum Power 3 Management Overview .........................................................................................................18
Spectrum Power 3 MultiSite Software Details ..................................................................................................19
EMS Operator/Dispatcher Training .......................................................................................................................20
Operator Training Simulator ..............................................................................................................................21
Operator Training Simulator - Advanced .............................................................................................................22
Spectrum Power 3 Overview ...............................................................................................................................23
Spectrum Power 3 Parameterization ....................................................................................................................24
Spectrum Power 3 Programming ........................................................................................................................25
Power Applications Training ...............................................................................................................................26
Spectrum Power 3 Real Time Data Server SWD...............................................................................................27
Spectrum Power 3 Report Generation ..................................................................................................................28
Spectrum Power 3 Security Administration ........................................................................................................29
Spectrum Power 3 Supervisory Control SWD ....................................................................................................30
Telecontrol Interface Hardware ..........................................................................................................................31
Spectrum Power 3 Telecontrol Server SWD .......................................................................................................32
Train the Trainer ...................................................................................................................................................33
Spectrum Power 3 User Interface SW Details ......................................................................................................34
Spectrum Power 3 Utilities .................................................................................................................................35
Spectrum Power 3 Web SDK Display Building ..................................................................................................36
Spectrum Power 4 ..................................................................................................................................................37
  Spectrum Power 4 Data Modeling ...................................................................................................................38
  Spectrum Power 4 Database Maintenance ........................................................................................................39
  Spectrum Power 4 Display Building ................................................................................................................40
  Spectrum Power 4 Parameterization ................................................................................................................41
<table>
<thead>
<tr>
<th>Table of Contents</th>
</tr>
</thead>
<tbody>
<tr>
<td>SHARED COMPONENTS</td>
</tr>
<tr>
<td>Historical Information System</td>
</tr>
<tr>
<td>Shared Historical Information System Administration</td>
</tr>
<tr>
<td>Shared Historical Information System Usage</td>
</tr>
<tr>
<td>Transmission Network Applications</td>
</tr>
<tr>
<td>Network Model Building</td>
</tr>
<tr>
<td>Transmission Network Applications Training</td>
</tr>
<tr>
<td>Distribution Network Applications</td>
</tr>
<tr>
<td>DNA Data Modeling and Data Validation</td>
</tr>
<tr>
<td>DNA Operator/Dispatcher Training</td>
</tr>
<tr>
<td>DNA Overview</td>
</tr>
<tr>
<td>Fault Management</td>
</tr>
<tr>
<td>Load Shed</td>
</tr>
<tr>
<td>Network Management</td>
</tr>
<tr>
<td>Optimal Feeder Reconfiguration</td>
</tr>
<tr>
<td>Power Flow and State Estimation</td>
</tr>
<tr>
<td>Short Circuit Calculation</td>
</tr>
<tr>
<td>Short Term Load Forecast</td>
</tr>
<tr>
<td>Volt/VAR Control</td>
</tr>
<tr>
<td>Technology Courses</td>
</tr>
<tr>
<td>Just Enough C Programming</td>
</tr>
<tr>
<td>Just Enough C++ Programming</td>
</tr>
<tr>
<td>Just Enough FORTRAN Programming</td>
</tr>
<tr>
<td>Just Enough Pascal Programming</td>
</tr>
<tr>
<td>Secure Coding</td>
</tr>
<tr>
<td>Data Engineering Workshops</td>
</tr>
<tr>
<td>Applications Data Engineering Workshop</td>
</tr>
<tr>
<td>Display Generation Data Engineering Workshop</td>
</tr>
<tr>
<td>Historian Data Engineering Workshop</td>
</tr>
<tr>
<td>Operator Training Simulator Data Engineering Workshop</td>
</tr>
<tr>
<td>SCADA Data Engineering Workshop</td>
</tr>
<tr>
<td>Role-Based Training</td>
</tr>
<tr>
<td>Spectrum Power 3</td>
</tr>
<tr>
<td>------------------</td>
</tr>
</tbody>
</table>

Spectrum Power 3
Spectrum Power 3 Application Data Viewer

This course provides participants with the skills to recognize the structure of ADV displays, to modify existing displays or create new ones. The necessary information to access and modify the ADB application data using ADV is also provided.

General Information

Course Code: E0805  
Length: 1-2 Days

Audience

This course is designed for those who are responsible for the ADV displays, including:
- Advanced Applications engineers

Prerequisites

Familiarity with power systems modeling concepts and theory, basic UNIX usage, and comfort with the vi editor are required. The UNIX and vi concepts are covered in the AIX Fundamentals and Basic System Administration.

Goals

Upon completion of this course, the students shall be able to:
- Understand the NA database structure and know how to access the database.

Topics

- Overview of the ADV Subsystem
- Display Types
- ADV Features
- ADV Conventions
- Display Cards Hierarchy
- Creating a new display / Modifying an existing display using DVE
Spectrum Power 3

Spectrum Power 3 Basic Data Processing SWD

In a Spectrum Power 3 system, the processing of digital, analog, and accumulator (counter) values is performed by the Basic Data Processing subsystem. This course provides the participant with detailed knowledge of Basic Data Processing. This course provides functional level detail and hands-on experience with Spectrum Power 3’s basic data processing function.

General Information

Course Code: E0580
Length: 3 Days

Audience

This course is designed for those responsible for maintaining, expanding, or adding functions to the SCADA applications, including:
• Software Engineers
• Programmer/Analysts

Prerequisites

• Spectrum Power 3 Programming

Goals

Upon completion of this course, the students shall be able to:
• Describe the purpose and processes of Basic Data Processing including the layout of the database model, program communication, NIM access, program functionality, test utilities, and quality codes.
• Work effectively as a user of the SCADA software, employing a working knowledge of basic data processing, and able to make reasonable user modifications.
• Demonstrate a full knowledge of the terminology used throughout the SCADA system.

Topics

• Overview
• Database Model
  – Data Types
  – NormElement Types
  – Element Types
  – Info Types
• NIM Database Access
• Program Functionality
  – Program Flow Overview
  – Data Flow Overview
  – SYM Utility Trace of Data Flow
  – Message Processing
  – Measured Value Processing
  – Counter Value Processing
  – Interfaces
    o Value Supply
    o Display Updating
  – Combination Processing
• Test Utilities
• Quality Codes
  – Representation
  – Management
  – Processing
Spectrum Power 3
Spectrum Power 3 Communication Front End

This course is a combination of lecture, demo and hands-on exercises. Become familiar with the Spectrum Power 3 front-end hardware and functionality. Learn the module diagnostic possibilities. Learn how to define the data required to interface customer RTUs and the CFE front-end.

### General Information

<table>
<thead>
<tr>
<th>Course Code:</th>
<th>E0595</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length:</td>
<td>2 Days</td>
</tr>
</tbody>
</table>

### Audience

This course is designed for those who need to configure and maintain the Communications Front-End, including:
- Communications Administrators
- System Hardware Maintainers/ Administrators
- Operations Support Personnel

### Prerequisites

- Fundamental Data Communication Knowledge
- It is helpful to have experience with:
  - IBM AIX
  - Spectrum Power 3 Database Maintenance

### Goals

*Upon completion of this course, the students shall be able to:*

- Describe the functionality and technologies applied in the Communications Front-End.
- Configure a Communications Front-End, using the “CFE User Guide” (U0595)
- Maintain and adapt the definitions required for the correct functioning of the Communications Front-End

### Topics

- Communications Front-End Overview
  - CFE Hardware
  - CFE Functionality
  - Data flow
- Technical terms
- Steps to configure the process interface
- Detailed procedure to configure the components of the process interface
  - Servers
    - CFEs
    - RFEs
  - Lines
  - Protocols
  - RTUs
  - Characteristics
  - System status information
- Population of the CFE ASR using ConfigSMI
- Diagnostic and test tools
  - Station Tabulars
  - rtcheck Utility
  - CFE Test and Diagnosis Application

---

Spectrum Power 3 Communication Front End
Spectrum Power 3

Spectrum Power 3 Data Modeling

This course provides the information needed to map a customer’s power system network topology to the Spectrum Power 3 data structure. Spectrum Power 3 structures data according to equipment topology.

**General Information**

<table>
<thead>
<tr>
<th>Course Code:</th>
<th>E0301</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length:</td>
<td>2 Days</td>
</tr>
</tbody>
</table>

**Audience**

This course is designed for those who are responsible for collecting the data needed to describe the customer's power system, including:
- Data Engineers
- Power System Engineers

**Prerequisites**

- A basic knowledge of power system equipment and characteristics, and the purpose of such devices as circuit breakers and transformers, is desirable. A short study of the Network Data Analysis Manual (U0301) is recommended.

**Topics**

- Overview
- Data Classification and Allocation
- Block Definition
- Names and Texts
- Block Type Selection
- Element Types / Information Definitions
- Block Integration
- Interlock Types

**Goals**

*Upon completion of this course, the students shall be able to:*
- Use the Spectrum Power 3 data terminology
- Describe the five technological address model used for data input
- Classify their own power system topology in Spectrum Power 3 terminology
- Identify the types of data needed to model the customer's system
Spectrum Power 3
Spectrum Power 3 Database Maintenance

This course describes the Spectrum Power 3 customer data entry system through the use of Oracle RDBMS interface scripts and forms and Spectrum Power 3 editors. It provides practice in data entry and validation, and covers the skills needed to maintain the Spectrum Power 3 database.

General Information
Course Code: E0320
Length: 5 Days

Audience
This course is designed for those who are responsible for the collection of data to be input into Spectrum Power 3, PDM data input, data correction, data integrity, and coordination of data changes, including:
- Database Administrator/Engineer
- Application Programmer

Prerequisites
- Data Modeling or a basic knowledge of power system equipment and characteristics, and the purpose of such devices as circuit breakers and transformers is desirable. Knowledge of UNIX and Relational Database Concepts is also desirable.

Goals
Upon completion of this course, the students shall be able to:
- Perform data entry and data validation
- Utilize RDBMS Interface scripts and forms to execute the following tasks:
  - Job Management
  - Base Applications Functions - import, export, transfer, delete, cancel
- Run reports and validations of primitive data
- Create a new substation and install it in the system
  - Enter the data required for an RTU
  - Assign technological addresses
  - Build the linkage between the RTU and the technological addresses
  - Enter the data needed for measurement points

Topics
- Logging onto Spectrum Power 3
- Spectrum Power 3 Job Management
- Technological Address
- Topology Types and Network Components
- NIM Data Definition Editors
  - Block
  - Element
  - Reference
- Data Acquisition Editors
  - Digital Forms
  - Analog Forms
  - Accumulator Forms
  - RTDS/CFE Forms
- Miscellaneous Editors
  - Interlock Decision Tables
  - Archive
  - Formula and Calculation
- Getting Started with the RDBMS Interface
  - General RDBMS concepts
  - RDBMS Interface Script Environment
  - RDBMS Interface Job Management
- Base Application Import
- Jobs and Job Management
- Reporting, Validating, and Exporting Primitive Data
- Transferring data Between the Primitive and Operational Database
- RDBMS Interface Forms
  - Forms Description
  - Forms Concepts
  - Forms Usage
Spectrum Power 3

Spectrum Power 3 Display Building

This course describes the display building process using the Spectrum Power 3 graphic editor. It provides practice in building one-line diagrams and associating database values with display variables.

General Information
Course Code: E0310
Length: 3 Days

Audience
This course is designed for those responsible for display building or who have an interest in display building, including:
- Display Builders
- Database Administrator/Engineer
- Application Programmer

Prerequisites
- Data Modeling, Spectrum Power 3 Database Maintenance or a basic knowledge of power system equipment and characteristics, and the purpose of such devices as circuit breakers and transformers is desirable.

Goals
Upon completion of this course, the students shall be able to:
- Create a new substation display and install it in the system
  - Create the display using existing models of stations for efficiency
  - Build the linkage between the technological address and the display.
  - Specify the symbols, colors, and other attributes for each linkage.
  - Create buttons for display selection.
- Describe the use of decision tables

Topics
- Overview
- Display Elements
  - Worldmaps
    - Segments
    - Window Groups
  - Figures
  - Figure Groups
  - Attribute Groups
  - Decision Tables
  - Icons
  - Variables
    - Analog
    - Digital
    - Local Figures
    - Keybox Linkages
- Window Group Editor
Spectrum Power 3
DNP3 - Introduction to SCADA Communication

This course introduces participants to the concepts of DNP3 communication. Participants gain an understanding of the basics of DNP3 Communication, Data Objects, Controls, Message Structure and templates.

General Information
Course Code: E0593
Length: 2 Days

Audience
This course is designed for those who are responsible for supporting data acquisition using the DNP 3.0 protocol, including:
- Communication Administrators
- Database Engineers
- Programmer/Analysts

Prerequisites
Introduction to DNP3 Communication - You must have prior experience to any Byte oriented Protocol communications.

Goals
Upon completion of this course, the students shall be able to:
- Describe the DNP3 Communication Layers, including the Data Link Layer and the Application Layer (Request & Response).
- Describe the use of Digital (Object 1,2), Analog (Object 30) & Accumulator (object 21 etc).
- Trace the flow of DNP3 Data Objects from devices to Spectrum Power 3.
- Identify the purpose of each field in the DNP3 Message structure.
- List the different types of Controls.
- List the different options for Digital and Analog controls.
- Explain the flow of DNP3 controls from devices to a Spectrum Power 3 System.
- Explain the importance of each Layer of the RAW message structure.
- Extract identifiers and values from the RAW message structure.
- Locate the corresponding data in the Spectrum Power 3 Data base.
- Compare the DNP3 Polling options.
- Configure Data Acquisition using the DNP3 Polling options.

Topics
- Overview DNP3 Communication
- DNP Data Objects
- DNP Controls
- Message Structure
- DNP Polling Options
- Examples
- DNP Protocol related to SIEMENS System
Spectrum Power 3

Spectrum Power 3 Hardware Overview

This course is tailored for each customer by the customer’s project team. Course content will vary as appropriate.

This course is given early in the project. It describes the hardware configuration of Spectrum Power 3 and basic BOS Runtime Software; Diagnostics; System Management Interface Tool (SMIT); and the online documentation tool, InfoExplorer.

This course is part of the Spectrum Power 3 Overview. Those interested in just this subject may wish to attend only this course, and omit the other overview segments.

<table>
<thead>
<tr>
<th>General Information</th>
<th>Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course Code: E1300</td>
<td>• Hardware configuration</td>
</tr>
<tr>
<td>Length: 1/2 Day</td>
<td>• Server functions</td>
</tr>
<tr>
<td>Audience</td>
<td>• Redundancy issues</td>
</tr>
<tr>
<td>This course is designed for</td>
<td>• Diagnostic functions</td>
</tr>
<tr>
<td>those who are interested in</td>
<td>• Unix configuration utilities (SMIT)</td>
</tr>
<tr>
<td>the hardware configuration</td>
<td></td>
</tr>
<tr>
<td>of the delivered system,</td>
<td></td>
</tr>
<tr>
<td>including:</td>
<td></td>
</tr>
<tr>
<td>• Managers</td>
<td></td>
</tr>
<tr>
<td>• Supervisors</td>
<td></td>
</tr>
<tr>
<td>• Engineers, technicians</td>
<td></td>
</tr>
<tr>
<td>• System Administrators</td>
<td></td>
</tr>
<tr>
<td>• Software Engineers</td>
<td></td>
</tr>
<tr>
<td>• Programmer/Analysts/DBA</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Prerequisites</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Goals</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Upon completion of this</td>
<td>• Identify the components in a Spectrum</td>
</tr>
<tr>
<td>course, the students</td>
<td>Power 3 hardware configuration</td>
</tr>
<tr>
<td>shall be able to:</td>
<td>• Specify the location of hardware</td>
</tr>
<tr>
<td></td>
<td>components</td>
</tr>
<tr>
<td></td>
<td>• Describe the operator controls on the</td>
</tr>
<tr>
<td></td>
<td>system</td>
</tr>
<tr>
<td></td>
<td>• Recognize the automatic diagnostic tests</td>
</tr>
<tr>
<td></td>
<td>• Identify basic SMIT operations</td>
</tr>
<tr>
<td></td>
<td>• Identify InfoExplorer operations</td>
</tr>
</tbody>
</table>
This course provides the participant with detailed application knowledge for the most critical Historical and Future Data Management subsystem functions. This course provides functional level detail and hands-on experience with Spectrum Power 3’s archive and schedule creation, archive access, and the RDBMS archive interface.

NOTE: The courses covering the Historical Information System (HIS) are in the SHARED COMPONENT section.

<table>
<thead>
<tr>
<th>General Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course Code: E0510</td>
</tr>
<tr>
<td>Length: 1 Day</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Audience</th>
</tr>
</thead>
<tbody>
<tr>
<td>This course is designed for those who are responsible for maintaining, expanding, or adding functions to the HFD application, including:</td>
</tr>
<tr>
<td>• Software Engineers</td>
</tr>
<tr>
<td>• Programmer/Analysts/DBA</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Prerequisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spectrum Power 3 Programming</td>
</tr>
<tr>
<td>Spectrum Power 3 Database Maintenance</td>
</tr>
<tr>
<td>Familiarity with AIX fundamentals</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Goals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upon completion of this course, the students shall be able to:</td>
</tr>
<tr>
<td>• List the four main functions of HFD and the servers in which the programs run.</td>
</tr>
<tr>
<td>• List the distinguishing characteristics of the methods used to collect HFD data.</td>
</tr>
<tr>
<td>• List the characteristics of the types of archives used to store data.</td>
</tr>
<tr>
<td>• Describe the ways in which HFD data can be viewed.</td>
</tr>
<tr>
<td>• Trace the flow of data to open-ended storage and back into the system.</td>
</tr>
<tr>
<td>• Describe the process of tailoring (parameterizing) the HFD processing.</td>
</tr>
<tr>
<td>• Set up archives using the Def File Data Base Editor.</td>
</tr>
<tr>
<td>• Set up filters to create a subset using the Val File Editor.</td>
</tr>
<tr>
<td>• Set up a cyclic RDBMS archive.</td>
</tr>
<tr>
<td>• Build and use Spectrum Power 3 displays that show historical data.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Overview</td>
</tr>
<tr>
<td>• Collecting HFD data.</td>
</tr>
<tr>
<td>• Characteristics of the archive types</td>
</tr>
<tr>
<td>• Viewing HFD data</td>
</tr>
<tr>
<td>• HFD data flow</td>
</tr>
<tr>
<td>• Parameterizing HFD processing.</td>
</tr>
<tr>
<td>• Setting up archives</td>
</tr>
<tr>
<td>• Setting up filters</td>
</tr>
<tr>
<td>• Setting up a cyclic RDBMS archive.</td>
</tr>
<tr>
<td>• Building and using Spectrum Power 3 displays for archive data</td>
</tr>
<tr>
<td>• Accessing data in the RDBMS archive.</td>
</tr>
<tr>
<td>• Program Functionality</td>
</tr>
<tr>
<td>• Collecting Data</td>
</tr>
<tr>
<td>• Displaying Archive Data</td>
</tr>
<tr>
<td>• Retrieving HFD Data</td>
</tr>
<tr>
<td>• Managing Archives</td>
</tr>
</tbody>
</table>
Spectrum Power 3 ICCP Software Details

This course provides the participant with detailed knowledge of the Spectrum Power 3 ICCP implementation.

**General Information**

<table>
<thead>
<tr>
<th>Course Code:</th>
<th>E0442</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length:</td>
<td>1 Day</td>
</tr>
</tbody>
</table>

**Audience**

This course is designed for those responsible for maintaining ICCP communications in a Spectrum Power 3 system, including:

- Software Engineers
- Communications Engineers

**Prerequisites**

- Spectrum Power 3 Database Maintenance
- Familiarity with ICCP fundamentals

**Goals**

*Upon completion of this course, the students shall be able to:*

- Modify the configuration files to add communication paths
- Describe the processes that support ICCP in a Spectrum Power 3 system including the program interface, configuration files, program functionality, and test utilities
- Use tools to troubleshoot connection and data flow problems

**Topics**

- Overview
  - System Interfaces
  - Processing Modules
- Database Setup
  - Links
  - Data Points
  - Processing Options
- Program Functionality
  - Data Input and Output
  - Network Control
  - Data Link Management
- Connection Troubleshooting
# ICCPNT Configuration and Operation

This course is a combination of lecture, demo and hands-on exercises. It provides information and steps necessary to configure and operate a Siemens ICCPNT system.

<table>
<thead>
<tr>
<th>General Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course Code: E0443</td>
</tr>
<tr>
<td>Length: 1 Day</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Audience</th>
</tr>
</thead>
<tbody>
<tr>
<td>This course is designed for those who want to work practically with the Siemens ICCPNT product, including:</td>
</tr>
<tr>
<td>• Communication Administrators</td>
</tr>
<tr>
<td>• System Hardware Maintainers/Administrators</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Prerequisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Basic knowledge of ICCP</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Goals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upon completion of this course, the students shall be able to:</td>
</tr>
<tr>
<td>• Prepare and install an ICCPNT system</td>
</tr>
<tr>
<td>• Configure an ICCPNT system</td>
</tr>
<tr>
<td>• Operate an ICCPNT system</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>• ICCP Overview</td>
</tr>
<tr>
<td>• Introduction</td>
</tr>
<tr>
<td>• Functionality</td>
</tr>
<tr>
<td>• Function blocks</td>
</tr>
<tr>
<td>• Interfaces</td>
</tr>
<tr>
<td>• User Interface</td>
</tr>
<tr>
<td>• Gateways</td>
</tr>
<tr>
<td>• MMS EASE introduction</td>
</tr>
<tr>
<td>• Limitations, prerequisites</td>
</tr>
<tr>
<td>• Redundancy</td>
</tr>
<tr>
<td>• Installation</td>
</tr>
<tr>
<td>• Exercises and Demos</td>
</tr>
<tr>
<td>• Configure User Interface</td>
</tr>
<tr>
<td>• Operational User Interface</td>
</tr>
<tr>
<td>• MMSEASE configuration</td>
</tr>
<tr>
<td>• Data Flow</td>
</tr>
<tr>
<td>• Test tools</td>
</tr>
<tr>
<td>• Trouble Shooting Strategy</td>
</tr>
</tbody>
</table>
Spectrum Power 3 Installation & Administration

This is lab-intensive course that prepares students to install and administer a Spectrum Power 3 system. It familiarizes participants with the procedures necessary to administer the system as an integrated entity, to recognize and respond to malfunctions, and to perform maintenance functions.

General Information
Course Code: E1210
Length: 5 Days

Audience
This course is designed for those who are responsible for installing software Spectrum Power 3 and keeping the system operational, including:
• System Administrators

Prerequisites
• Spectrum Power 3 Programming, familiarity with AIX Fundamentals and AIX System Administration.

Goals
Upon completion of this course, the students shall be able to:
• Install AIX configured for Spectrum Power 3.
• Configure Spectrum Power 3.
• Create Spectrum Power 3 volume group (/homevg).
• Install Spectrum Power 3 system.
• Install Oracle for use with Spectrum Power 3.
• Configure the Spectrum Power 3 server types (COM, ADM, etc.).
• Configure dual LANs.
• Configure consoles on the system.
• Configure loggers and printers.
• Start-up the system and its components.
• Shutdown the system and its components.
• Create and test a spare configuration.
• Interpret and react to error messages generated by Spectrum Power 3.
• Use procedures for saving and restoring the operational database.
• Describe the backup functions required for normal maintenance.
• Use the build procedures to generate the system from source.

Topics
• AIX Installation from a NIM Master
• Spectrum Power 3 Configuration and Installation
• Oracle Installation
• Configuring Server Types
• Configuring Peripheral Equipment
  – LANs
  – Consoles
  – Loggers and Printers
• Spectrum Power 3 Startup and Shutdown
• Configuring Redundant Servers
• Error Message Analysis
• Database Save and Restore Procedures
• System Generation
Spectrum Power 3
Spectrum Power 3 Management Overview

This course is tailored for each customer by the customer’s project team. Course content will vary as appropriate. This course is given early in the life of a project and presents the system in broad terms. The course serves as a top down overview of the hardware, the software, and configuration. The capabilities of the system are introduced. This course is part of the Spectrum Power 3 Overview. Those interested in just this subject may wish to attend only this course, and omit the other overview segments.

**General Information**

- Course Code: E0001
- Length: 1/2 Day

**Topics**

- System Functional Overview
- Hardware Configuration Overview
- Software Overview
- System Data Flow
- System Design Goals

**Audience**

Management needing to know what the system includes; project personnel needing an introduction to the system.

**Prerequisites**

None

**Goals**

*Upon completion of this course, the students shall be able to:*

- Discuss the system capabilities at a high level.
- Recognize system, hardware, and software terminology.
- Describe the merits of the configuration.
- Identify the needs served by the major components of the configuration.
- Describe the general flow of data through the system.
Spectrum Power 3
Spectrum Power 3 Multisite Software Details

This course provides the participant with detailed knowledge of and hands-on experience with the Spectrum Power 3 Multisite implementation.

<table>
<thead>
<tr>
<th>General Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course Code: E0470</td>
</tr>
<tr>
<td>Length: 3 Day</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Audience</th>
</tr>
</thead>
<tbody>
<tr>
<td>This course is designed for those responsible for maintaining Multisite Software Details communications in a Spectrum Power 3 system, including:</td>
</tr>
<tr>
<td>• Software Engineers</td>
</tr>
<tr>
<td>• Communications Engineers</td>
</tr>
<tr>
<td>• Programmer/Analysts</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Prerequisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spectrum Power 3 Database Maintenance</td>
</tr>
<tr>
<td>Spectrum Power 3 Programming</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Goals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upon completion of this course, the students shall be able to:</td>
</tr>
<tr>
<td>• Describe the purpose and processes of the Multisite subsystem including the data flow, program communication, and program functionality.</td>
</tr>
<tr>
<td>• Given two independent configured Spectrum Power 3 systems, configure them to communicate with another system using Multisite.</td>
</tr>
<tr>
<td>• Configure a Multisite connection.</td>
</tr>
<tr>
<td>• Describe the processes that support Multisite in a Spectrum Power 3 system including the program interface, configuration files, program functionality, and test utilities</td>
</tr>
<tr>
<td>• Use tools to troubleshoot connection and data flow problems</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Overview</td>
</tr>
<tr>
<td>• Multisite Configuration</td>
</tr>
<tr>
<td>• Configuring Servers</td>
</tr>
<tr>
<td>• Configuring Control Centers</td>
</tr>
<tr>
<td>• Configuring Connections</td>
</tr>
<tr>
<td>• Data Distribution</td>
</tr>
<tr>
<td>• Synchronizing the Runtime Files</td>
</tr>
<tr>
<td>• Synchronizing the Operational Database</td>
</tr>
<tr>
<td>• Synchronizing the Primitive Database</td>
</tr>
<tr>
<td>• Database Maintenance</td>
</tr>
<tr>
<td>• Specifying Shared Database Blocks</td>
</tr>
<tr>
<td>• Specifying Shared Infos</td>
</tr>
<tr>
<td>• Data Base Model</td>
</tr>
<tr>
<td>• The NIM Database Structure</td>
</tr>
<tr>
<td>• Data Types</td>
</tr>
<tr>
<td>• Normelements</td>
</tr>
<tr>
<td>• Elements and Element Types</td>
</tr>
<tr>
<td>• Infos and Info types</td>
</tr>
<tr>
<td>• Program Functionality</td>
</tr>
<tr>
<td>• Software Components</td>
</tr>
<tr>
<td>• Data Flow</td>
</tr>
<tr>
<td>• Troubleshooting</td>
</tr>
<tr>
<td>• Network Connectivity Troubleshooting</td>
</tr>
<tr>
<td>• Console Log</td>
</tr>
<tr>
<td>• Trace facility</td>
</tr>
</tbody>
</table>
Spectrum Power 3
EMS Operator/Dispatcher Training

This tailored course provides participants with background information and hands-on practice in using the EMS for operating the power system. System configuration and functionality are covered, with emphasis on application programs used in operating the power system. Use of the Basic Signaling Window, tool bars, and pull-down menus is described. Software details and terminology are avoided. During the lab sessions, participants practice what they have learned. The course is modular allowing it to be adapted to the functionality of each customer’s EMS.

**General Information**
- Course Code: E0502
- Length: 5 Days

**Audience**
This course is designed for those who will use the EMS to operate the power system, including:
- Operators/Dispatchers
- Operations Engineers

**Prerequisites**
- Participants should be familiar with use of a previous generation EMS. Familiarity with basic Windows operations is also assumed

**Goals**
*Upon completion of this course, the students shall be able to:*
- Navigate efficiently through system displays
- Operate power system
- Management of the Data Acquisition
- Monitor and interpret data provided by EMS applications

**Topics**
- Display Navigation
  - Display Selection
  - Zoom and Pan Features
- Monitoring System digital Analog Values and the Status of Devices
- Operation of Power System Equipment (circuit breakers, tap changes, etc.) using Supervisory Control
- Tag and Management
- Alarm Processing
- Trend Display Management
- Sequence of Events and Disturbance Data Collection
- Energy Accounting
- Historical Data Collection
- Automatic Generation Control
  - ACE and frequency
- Network Applications
  - State Estimator
  - Security Analysis
  - Operator Power Flow
- Interchange Scheduler
- System Load Forecast
- Outage Scheduler
- Emergency Applications
  - Voltage Reduction
  - Rotating Load Shed.
Spectrum Power 3
Operator Training Simulator

This course provides participants with background information and hands-on practice in using the Spectrum Power 3 Operator Training Simulator (OTS). OTS set up and operation are covered. During the lab sessions, participants practice what they have learned.

**General Information**

- **Course Code:** E0900
- **Length:** 3 Days

**Audience**

System operator instructors and operations engineers who will configure and use the OTS, including:
- System Administrators
- Operations personnel
- Operations Trainers

**Prerequisites**

- Introduction to the EMS for System Operators

**Goals**

*Upon completion of this course, the students shall be able to:*
- Initialize and create base cases.
- Create events for use in training simulations.
- Manipulate the substation equipment in the OTS model.
- Use the external AGC model.
- Monitor the trainee’s performance.

**Topics**

- Training Simulator Data base topics
- Base Case Management
- Training Scenario creation and management
- Training Simulator Data Flows
- Using the external AGC model
- Monitoring trainee performance
Spectrum Power 3
Operator Training Simulator - Advanced

This course provides participants with additional background information and hands-on practice in using the Spectrum Power 3 Operator Training Simulator (OTS). Database population, advanced scenario creation, and troubleshooting are covered. During the lab sessions, participants practice what they have learned.

General Information
Course Code: E0900a
Length: 2 Days

Audience
System operator instructors and operations engineers who will configure and maintain the OTS, including:
- System Administrators
- Operations Trainers

Prerequisites
- Operator Training Simulator

Goals
Upon completion of this course, the students shall be able to:
- Operate and maintain OTS effectively.
- Initialize OTS by various available forms and understand the differences
- Update and maintain SCADA/AGC, PSM and NA databases in OTS
- Run various NA functions in OTS
- Create pertinent complex scenarios such as load shedding, blackstart, voltage control etc
- Run health check scripts and understand the output
- Understand the various error logging features available

Topics
- OTS Database population
  - SCADA/AGC
  - PSM
  - NA
  - when to update databases
- OTS Basecases and snapshots
  - Basecase/snapshot overview
  - Basecase and scenario development
- OTS Initialization
  - Base case 0
  - EMS DPF/OPF Transfer
  - RT-Snapshot
  - HIS Initialization
  - Failure of Initialization issue
- OTS Error logs
- OTS Healthcheck scripts
Spectrum Power 3

Spectrum Power 3 Overview

This course is tailored for each customer by the customer’s project team. Course content will vary as appropriate. This course describes the purpose and features of the base software applications.

<table>
<thead>
<tr>
<th>General Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course Code: E0100</td>
</tr>
<tr>
<td>Length: 1/2 Day</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Audience</th>
</tr>
</thead>
<tbody>
<tr>
<td>This course is designed for those need an introduction to the Spectrum Power 3 system, including:</td>
</tr>
<tr>
<td>• Managers</td>
</tr>
<tr>
<td>• Supervisors</td>
</tr>
<tr>
<td>• System Administrators</td>
</tr>
<tr>
<td>• Software Engineers</td>
</tr>
<tr>
<td>• Programmer/Analysts/DBA</td>
</tr>
<tr>
<td>• Operations</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Prerequisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>• None</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Goals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upon completion of this course, the students shall be able to:</td>
</tr>
<tr>
<td>• Describe the features of the applications.</td>
</tr>
<tr>
<td>• Understand the general flow of data through the applications.</td>
</tr>
<tr>
<td>• Begin reviewing of the software functional specifications.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction to functions to:</td>
</tr>
<tr>
<td>• Manage the Spectrum Power 3 configuration, data transmission, and communications.</td>
</tr>
<tr>
<td>• Generate, organize, and access the information used in a Spectrum Power 3 system.</td>
</tr>
<tr>
<td>• Provide the user interface to the information.</td>
</tr>
<tr>
<td>• Provide the SCADA and historical data information capabilities.</td>
</tr>
<tr>
<td>• The relationships of the applications within Spectrum Power 3 are described, along with key user interfaces.</td>
</tr>
</tbody>
</table>
Spectrum Power 3 Parameterization

This course is a combination of lecture, demo and hands-on exercises. It covers the process of identifying and selecting the options (parameters) in Spectrum Power 3 that meet a project's requirements for status processing and the user interface.

### General Information

<table>
<thead>
<tr>
<th>Course Code:</th>
<th>E0300</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length:</td>
<td>5 Days</td>
</tr>
</tbody>
</table>

### Audience

This course is designed for those who need to map a project's requirements to the parameters available to customize a Spectrum Power 3 system including analysts, designers, integrators, and operators.

### Prerequisites

- Familiarity with the project requirements.

### Goals

*Upon completion of this course, the students shall be able to:*

- Describe the database model used in Spectrum Power 3.
- Specify the project's naming convention and assign names to all the components, including real-time data and computer system devices.
- Specify the message texts for alarm and status notifications.
- Specify the characteristics and required processing for each type of information collected and maintained by the system.
- Specify the data to be collected and maintained for each type of device in the power network.
- Specify the automatic checks made by the system when supervisory control actions are initiated by operators or applications.
- Specify the user interface, including:
  - the colors, figures, and attributes used to indicate the state of electrical network components and measurements.
  - the layers of detail presented on one-line diagrams.
  - the buttons and links on displays.
  - the alarm lists and summaries.
- Specify formulas and characteristic curves.
- Specify user access and authorities.
- Size the database to meet the requirements.

### Topics

- Overview
- Database Model
- Message Formats
- Message Classes
- Infos and Infotypes
- Elements and Element Types
  - Configuring Digital Elements
  - Configuring Alarm Elements
  - Configuring Analog Elements
  - Configuring Limit Violation Elements
  - Configuring Counter Elements
  - Configuring Tap Position Elements
- Tags and Flags
- Block Types
- Topology Types
- Interlock checking
- Network Coloring
- User Interface
  - Prototype Process
  - Terminology and Conventions
  - Images
  - Coloring
  - Dynamic Image Determination
- Value Representation
- Key (Button) Representation
- Info Groups
- Alarm Lists and Summaries
- Toolbars
- Formulas
- Characteristic Curves
- Access Rights and Authorities
- Computer Network Components
- Database Sizing
Spectrum Power 3 Programming

This course is a combination of lecture, demo, and hands-on exercises. It provides participants with skills needed to program in the Spectrum Power 3 environment.

### General Information

<table>
<thead>
<tr>
<th>Course Code:</th>
<th>E0401</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length:</td>
<td>5 Days</td>
</tr>
</tbody>
</table>

### Audience

This course is designed for those who are responsible for maintaining, expanding, or adding functions to Spectrum Power 3, including:

- Software Engineers
- Programmer/Analysts

### Prerequisites

- C or PASCAL programming, basic UNIX usage, and familiarity with power system concepts are required. The UNIX concepts are covered in the AIX Basics course.

### Goals

*Upon completion of this course, the students shall be able to:*

- Describe the directory structure and locate applications, subsystems and functions
- Extract and check in code in using the source code management (SRC) utility
- Modify and test code
- Generate error messages
- Configure and use the inter-program communication process in a program
- Use data access routines
- View data structures
- Add new attributes to existing data structures
- Describe the steps for adding data
- Describe the Database Maintenance data flow
- Describe real time data flow
- Use the trace and debug utilities

### Topics

- **Overview**
  - Key Terms
  - Key Concepts
- **Software Organization**
  - Directory Structures
  - Naming Conventions
- **Softbus**
  - Functionality
  - Configuration
  - Program Interface
- **Database**
  - Defining Records and Relations
  - Program Interface
- **SCADA Software Overview**
  - Database Administration
  - Basic Data Processing
  - Display Basics
  - Historical and Future Data Management
- **Troubleshooting**
Spectrum Power 3
Power Applications Training

This course provides the participant with the information needed to maintain and enhance the Spectrum Power 3 Applications.

### General Information

<table>
<thead>
<tr>
<th>Course Code:</th>
<th>E0600</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length:</td>
<td>3-5 Days</td>
</tr>
</tbody>
</table>

### Audience

Those responsible for maintaining and enhancing the Spectrum Power 3 Applications, including:
- System Administrators
- Software Engineers
- Programmer/Analysts/DBA

### Prerequisites

- Familiarity with Power System modeling concepts
- Familiarity with AGC theory
- Spectrum Power 3 Overview Course

### Goals

Upon completion of this course, the students shall be able to:
- Explain the basic concepts of generation modeling for AGC purposes
- Build Power Application models
- List the functions of the Power Applications software
- Use and navigate through the displays of Spectrum Power 3 Applications functions
- Make modifications to the Power Applications model and displays.

### Topics

- Functional design of the power applications functions
- Algorithms and models used by the Power Applications
- Programming techniques for the Power applications
- Software implementation aspects
- Database implementation aspects
## Spectrum Power 3 Real Time Data Server SWD

This course provides the participant with application knowledge of the Real Time Data Server (RTDS). It covers the functions of the RTDS software, the flow of data between major programs, the links to other applications, and the setup and customization of the processes.

### General Information

<table>
<thead>
<tr>
<th>Course Code:</th>
<th>E0590</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length:</td>
<td>1 Day</td>
</tr>
</tbody>
</table>

### Audience

This course is designed for those who are responsible for maintaining, expanding, or adding functions to the SCADA applications, including:
- Software Engineers
- Programmer/Analysts/DBA

### Prerequisites

- Familiarity with AIX fundamentals
- Spectrum Power 3 Programming

### Goals

*Upon completion of this course, the students shall be able to:*

- Describe the purpose and processes of RTDS, including basic concepts, software structure, database, troubleshooting, and utilities.
- Demonstrate a full knowledge of the RTDS terminology used throughout the SCADA system.
- Add points to be scanned by the RTDS.
- Use the RTDS utilities to investigate and/or simulate the processes associated with the RTDS.

### Topics

- SCADA Data Flow
- Software processes running in the RTDS
- Defining Scan Information
- Simulating the RTDS
- Other utilities
Spectrum Power 3 Report Generation

This course provides participants with the information needed to create, modify, delete, and print reports as an on-line Spectrum Power 3 function. The ability to link reports to data is described and demonstrated with sample data. The Spectrum Power 3 report capability is provided by the Report Control function in conjunction with displays created using a graphic editor. This is primarily user training, intended to help customers prepare reports.

General Information
Course Code: E0525
Length: 1/2 Day

Audience
This course is designed for users whose responsibilities include the definition, creation, or maintenance of on-line reports, including:
- Data Engineers
- Software Engineers
- Programmer/Analysts/DBA

Prerequisites
Experience in the use of the graphic editor tool to create on-line displays is required (provided by the Spectrum Power 3 Display Building course). Knowledge of customer data and report needs is useful.

Goals
Upon completion of this course, the students shall be able to:
- Describe the knowledge needed to lay out a report
- Identify display characteristics needed by the report tool
- Determine whether a display can be used for a report
- Create a report
- Cause a report to print on demand
- Cause a report to print periodically
- Change the print timing of an existing report
- Delete a report
- Link reports to pre- or post-processing applications

Topics
- Data requirements for reporting
- Display requirements for reporting
- Data Flow
- Creating reports
- Report Scheduling
- Linking reports to Applications
Spectrum Power 3
Spectrum Power 3 Security Administration

This course provides participants with the skills to configure Spectrum Power 3 to conform to deregulation and system security requirements. The deregulation-related topics focus on configuring the Spectrum Power 3 User Interface to manage access to the system. The system security topics focus mainly on the Spectrum Power 3 tools, features, and parameters available to tighten system security, but they also include discussions of operating system, network, and application security features, as well as methods to maintain users and enable their access to Spectrum Power 3 utilities.

**General Information**

Course Code: E1214
Length: 3 Days

**Audience**

This course is designed for those who are responsible for administering Spectrum Power 3 systems, including:

- System Administrators
- Network Administrators
- Communication Administrators
- System Programmers
- Application Programmers

**Prerequisites**

Familiarity with UNIX systems, basic UNIX usage, system and network administration, and the Spectrum Power 3 User Interface.

**Goals**

Upon completion of this course, with respect to a Spectrum Power 3 system, the students shall be able to:

- List the techniques and parameters used to "harden" AIX and Oracle.
- Identify the special usernames used and list the roles associated with the usernames.
- Create additional usernames modeled after the special usernames.
- Identify the groups used in the system and list the roles associated with each group.
- Configure user access to the Spectrum Power 3 utilities using sudo.
- Identify the applications and ports used in network communication.
- Configure a host-based firewall using IPFilter.
- Test the system security using the Toolkit.
- Explain how authorities are defined, assigned, and enforced.
- Describe how technological areas are defined, assigned, and enforced.
- Describe how message classes are defined and assigned.
- Explain how to assign a specific Basic Signaling Window to a console.

**Topics**

- System Overview
- System Security
  - Security Risks
  - Spectrum Power 3 Security Toolkit
  - Hardening AIX
    - Trusted Computing Base
    - Securing the System Logs
    - Disabling and Restricting Services
    - Validate AIX installation and Spectrum Power 3 files
  - Hardening Oracle
    - Username/Password Management
    - Patch Management
  - User Access Control
    - Special User Accounts
    - Special User Groups
    - AIX User Access Features
  - Network Security
    - Network Applications (ssh, ftp, rsh, ...)
    - Server Network Connections (Softbus)
    - SCADA Network Connections
    - Firewalls
  - Spectrum Power 3 Security Toolkit
- User Interface Access Controls
  - Authorities
    - Assigning Authorities
    - Console Assignments
    - User Assignments
    - Window Group Assignments
  - Enforcing Authorities
    - Login/Logout
    - SVCBRAN Relation
    - Display Callup
    - Program Checks
    - Monitoring Changes
  - Technological Areas
  - Message Classes
  - Basic Signaling Window Assignment
Spectrum Power 3

Spectrum Power 3 Supervisory Control SWD

This course provides the participant with detailed knowledge for Network Control. This course provides functional level detail and hands-on experience with Spectrum Power 3’s network control application.

General Information
Course Code: E0535
Length: 1 Day

Audience
This course is designed for those who are responsible for maintaining, expanding, or adding functions to the SCADA applications, including:

- Software Engineers
- Power System Engineers
- Programmer/Analysts

Prerequisites
- Spectrum Power 3 Data Modeling
- Spectrum Power 3 Programming
- Spectrum Power 3 Basic Data Processing
- Software Details.

Goals
Upon completion of this course, the students shall be able to:

- Describe the purpose and processes of Network Control including TAFLA, NCMA, SSAS, CESS, NCEX, setpoint processing, network control utility, and network control job editor
- Work effectively as a user of the SCADA software
- Demonstrate a working knowledge of network control, including making user modifications
- Demonstrate a full knowledge of the terminology used in Network Control

Topics
- Overview
- Program Functionality
  - Tag and Flag Processing – TAFLA
  - Network Control Manager – NCMA
    - Control Request Processing
    - Control Request Program Interface
    - Database Organization
  - Switching Sequence Processing – SSAS
  - Request Checking – CESS
    - Interlock Decision Tables
    - Adding Functions to Interlock Tables
  - Request Execution – NCEX
  - Setpoint Processing – SPCO and SPED
  - Switching Procedure Management
    - Overview
- Test Utilities – NCU
Telecontrol Interface Hardware

The focus of this course is the configuration of the TCI hardware and the usage of test & diagnosis tools. The course contains adequate opportunity for practical exercises.

**General Information**
Course Code: E1315
Length: 2 Days

**Topics**
- TCI Hardware configuration
- TCI Diagnostic commands
- TCI Trace
- Location of system error and log files

**Audience**
This course is designed for those who are responsible for supporting the telecontrol interface, including:
- System Administrators
- Telecontrol technicians

**Prerequisites**
A basic understanding of computer hardware.

**Goals**
*Upon completion of this course, the students shall be able to:*
- Configure TCI hardware.
- Use diagnostic commands.
- Trace TCI messages.
Spectrum Power 3

Spectrum Power 3 Telecontrol Server SWD

This course provides the participant with application knowledge of the Telecontrol Server (TCS). It covers the functions of the TCS software, the flow of data between major programs, the links to other applications, and the setup and customization of the processes.

General Information
Course Code: E0591
Length: 1 Day

Audience
This course is designed for those who are responsible for maintaining, expanding, or adding functions to the SCADA applications, including:
- Software Engineers
- Programmer/Analysts

Prerequisites
- Familiarity with AIX fundamentals
- Spectrum Power 3 Programming

Goals
Upon completion of this course, the students shall be able to:
- Describe the purpose and processes of TCS, including basic concepts, software structure, database, troubleshooting, and utilities.
- Demonstrate a full knowledge of the TCS terminology used throughout the SCADA system.
- Add points to be scanned by the TCS.
- Use the TCS utility programs to investigate and/or simulate the processing associated with the TCS.

Topics
- Telecontrol Interface (TCI) Configuration
- Software applications running in the TCS
- Program interfaces
- TCS Data Flow
- Trouble shooting the TCS
- Configuring the TCS
- Adding points scanned by the TCS
- Simulating the TCS functions
- Utilities
Spectrum Power 3
Train the Trainer

This course is a combination of lecture, labs, and hands-on exercises that provides the student with practical experience operating the EMS system. It provides a functional summary of the base system and the application modules. Fundamental training concepts are presented.

**General Information**
- **Course Code:** TTT
- **Length:** 3 Days

**Audience**
This course is designed for those who are responsible training the dispatchers

**Prerequisites**
- Introduction to the EMS for System Operators, or
- Operator/Dispatcher Training
- Dispatcher Training Simulator Training

**Goals**
*Upon completion of this course, the students shall be able to:*
- Generate training objectives and lesson plans.
- Organize interactive activities.
- Identify labs to create DTS scenarios
- Describe how to deliver the training course to the Operators, how to use any existing training materials in the classroom, how to develop good training materials for use in the classroom and how to handle difficult classroom situations.
- Describe the EMS system configuration, application, capability, and performance concepts.
- Use general operating procedures that cover all system features.

**Topics**
- **Train The Trainer Fundamentals**
  - Review materials
  - Classroom
  - How People Learn
  - Training Skills
  - Communication Skills
- **System Overview**
- **Navigation**
  - Log-on steps
  - Areas of Jurisdiction
  - User Access Restrictions
- **Minor troubleshooting**
- **Training Exercises**
  - Develop

**Optional 1 cycle of Operator Training can be scheduled to follow this session for reinforcement.**
Spectrum Power 3
Spectrum Power 3 User Interface SW Details

This course provides the participant with detailed application knowledge for the most critical User Interface (UI) functions. This course provides functional level detail and hands-on experience with Spectrum Power 3’s console management, display management, and input event management.

General Information
Course Code: E0210
Length: 4 Days

Audience
This course is designed for those who are responsible for maintaining, expanding, or adding functions to the SCADA applications, including:
- Software Engineers
- Programmer/Analysts

Prerequisites
- Spectrum Power 3 Programming
- Spectrum Power 3 Database Maintenance
- Familiarity with AIX fundamentals.

Goals
Upon completion of this course, the students shall be able to:
- Describe the purpose and processes of User Interface, including console management, display management, and input event management
- Add and secure a UI console and a UI server to the system configuration
- Manage the database changes associated with adding new displays
- Add new input functions to the UI
- Describe the interfaces used by a display interface (mask) program
- Describe the interfaces used by a Web-based display interface program (WebSDK)
- Demonstrate a full knowledge of the terminology used in the User Interface subsystems

Topics
- Overview
- Console Management
  - Configuring Consoles
  - Securing Consoles
  - Troubleshooting Consoles
- Display Management
  - Overview of Display Editing
    - Graphic Editor
    - WebSDK
  - Database Management
  - Data Supply Overview
- Input Event Management
  - Buttons and Pokepoints
    - Database Changes
    - Software Changes
  - Softkeys and Toolbars
    - Database Changes
    - Software Changes
  - WebSDK Interfaces
Spectrum Power 3
Spectrum Power 3 Utilities

This course provides participants with the syntax and the strategies for using the Spectrum Power 3 utility programs to monitor, manage, and maintain a Spectrum Power 3 system.

General Information
Course Code: E0130
Length: 3 Days

Audience
This course is designed for those who are responsible for Spectrum Power 3 system administration and support, including:
• Data Engineers
• System Administrators
• Software Engineers
• Programmer/Analysts

Prerequisites
Experience working with Spectrum Power 3 software. The following courses are useful for gaining this experience:
• Spectrum Power 3 Overview
• Spectrum Power 3 Programming
• Spectrum Power 3 Installation and Administration

Goals
Upon completion of this course, the students shall be able to:
• Locate and list information about elements in the database
• Display and edit database information
• Restructure database files
• Monitor message flow on a running system
• Monitor server status on a running system
• Monitor and stimulate connected field devices.
• Stimulate data processing by simulating scan data
• Monitor and edit the Spectrum Power 3 archive data
• Perform system performance benchmarking and tuning.
• Extract and check-in source code
• Trace a running program and examine a core dump.

Topics
• Overview of Utilities
• Database Utilities
  – bq
  – dbu
  – dml
  – dmt
  – dbs
  – adu
• System Utilities
  – bum
  – spv
  – pam
  – sos
• SCADA Utilities
  – rtcheck
  – CfeTnD
  – ncu
• Data Processing Utilities
  – mpu
  – vau
  – vac
• HFD Utilities (aru) (optional)
• Source Code Utilities
  – src and/or ClearCase
• Debugging Utilities
  – dbx
  – sym
Spectrum Power 3 Web SDK Display Building

This course is a combination of lecture, demo and hands-on exercises. In the Web SDK Display Building Course students will learn the basic design and function of the Web UI application and how to build displays for the application. Building displays consists of creating and modifying XML display configuration files. There are 2 main types of displays; Tabular and Custom. Tabular displays display data in a predefined tabular layout and can incorporate data filters and charts. Custom displays give you the capability to place display elements such as text boxes, select lists, checkboxes, as well as tables and charts, anywhere on the display. Students will be shown how a simple tabular display can be built fairly quickly and easily and how a detailed custom display can be flexible and powerful.

**General Information**

Course Code:  WebUI01  
Length:  3 Days

**Audience**

This course is designed for those who need to build and maintain Web UI displays:  
- Display Builders

**Prerequisites**

- Microsoft Windows File System Knowledge  
- Basic Database Knowledge  
- HTML and Programming Knowledge is helpful

**Goals**

*Upon completion of this course, the students shall be able to:*

- Describe the basic functionality of and technologies involved in the WebSDK application  
- Build tabular displays and add them to the menu  
- Build custom displays

**Topics**

- Overview of WebSDK Features  
- Display Definition File overview  
  - Commands Overview  
- Creating a Custom display definition  
  - Display definition  
    - Display initialization  
    - Data accessing and display  
    - Java Scripts  
    - Event handling  
    - Authentication  
  - Group definition  
  - Controls definition  
- Building Tabular Displays – tips and tricks  
  - Setting Layout  
  - Paging / Scrolling  
  - Data formatting  
  - Data access  
  - Charting  
  - Permission Framework  
  - Event processing  
- Building Custom Displays – tips and tricks  
  - Setting Layout  
  - Data formatting  
  - Data access  
- Future directions  
  - Overview WebSDK Display Editor  
- Labs  
  - Building a simple tabular display  
  - Building a simple custom display
## Spectrum Power 4 Data Modeling

This course provides the information needed to map a customer’s power system network topology to the Spectrum Power 4 data structure. Spectrum Power 4 structures data according to equipment topology.

<table>
<thead>
<tr>
<th>General Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course Code: E0301</td>
</tr>
<tr>
<td>Length: 2 Days</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Audience</th>
</tr>
</thead>
<tbody>
<tr>
<td>This course is designed for those who are responsible for collecting the data needed to describe the customer's power system, including:</td>
</tr>
<tr>
<td>• Data Engineers</td>
</tr>
<tr>
<td>• Power System Engineers</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Prerequisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>A basic knowledge of power system equipment and characteristics, and the purpose of such devices as circuit breakers and transformers, is desirable. A short study of the Network Data Analysis Manual (U0301) is recommended.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Goals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upon completion of this course, the students shall be able to:</td>
</tr>
<tr>
<td>• Understand Spectrum Power 4 data terminology</td>
</tr>
<tr>
<td>• Describe the five technological address model used for data input</td>
</tr>
<tr>
<td>• Classify their own power system topology in Spectrum Power 4 terminology</td>
</tr>
<tr>
<td>• Identify the types of data needed to model the customer's system</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Overview</td>
</tr>
<tr>
<td>• Data Classification and Allocation</td>
</tr>
<tr>
<td>• Block Definition</td>
</tr>
<tr>
<td>• Block Type Selection</td>
</tr>
<tr>
<td>• Names and Texts</td>
</tr>
<tr>
<td>• Interlock Types</td>
</tr>
<tr>
<td>• Element Types / Information Definitions</td>
</tr>
<tr>
<td>• Block Integration</td>
</tr>
</tbody>
</table>
Spectrum Power 4
Spectrum Power 4 Database Maintenance

This course describes the Spectrum Power 4 customer data entry system, known as Source Data Management (SDM). Data entry is accomplished through the use of SDM forms and/or scripts and database editors. The course provides practice in data entry and validation; and covers the skills needed to maintain the Spectrum Power 4 database.

General Information
Course Code: E0320
Length: 5 Days

Audience
This course is designed for those who are responsible for the collection of data to be input into Spectrum Power 4, Source Data Management (SDM) data input, data correction, data integrity, and coordination of data changes, including:
- Database Administrator/Engineer
- Application Programmer

Prerequisites
- Data Modeling or a basic knowledge of power system equipment and characteristics, and the purpose of such devices as circuit breakers and transformers is desirable. Knowledge of UNIX and Relational Database Concepts is also desirable.

Goals
Upon completion of this course, the students shall be able to:
- Perform data entry and data validation
- Utilize SDM scripts and forms to execute the following tasks:
  - Job Management
  - Base Applications Functions - import, export, transfer, delete, cancel
- Run reports and validations of source data
- Create a new substation and install it in the system
  - Enter the data required for an RTU
  - Assign technological addresses
  - Build the linkage between the RTU and the technological addresses
  - Enter the data needed for measurement points

Topics
- SDM Basics
  - Job Management
  - Validation, Transfer, and Activation
  - Job Interlocks
  - Forms Usage
- Job Management Forms
- Report Forms
  - Error Reports
  - Database Content Reports
  - User-Defined Reports
- SCADA Data Definition Forms
  - Technological Address Review
  - Block
  - Element
- Data Acquisition Forms
  - Digital Forms
  - Analog Forms
  - Accumulator Forms
  - Formula and Calculation
  - Connectivity Forms
  - Network Group Forms
  - CFE Forms
- Miscellaneous Forms
  - Archive
  - Interlock Decision Tables
- Base Application Import and Export
  - Import/Export Files (IDDUGs)
  - Import/Export Process
- RDBMS Interface Scripts
Spectrum Power 4 Display Building

This course describes the display building process using the Spectrum Power 4 graphic editor. It provides practice in building displays and associating database values with display variables.

General Information

Course Code: E0310
Length: 3 Days

Audience

This course is designed for those responsible for display building or who have an interest in display building, including:
- Display Builders
- Database Administrator/Engineer
- Application Programmer

Prerequisites

- Data Modeling
- Spectrum Power 4 Database Maintenance or a basic knowledge of power system equipment and characteristics, and the purpose of such devices as circuit breakers and transformers.

Goals

Upon completion of this course, the students shall be able to:
- Create a new substation display and install it in the system
  - Create the display using existing models of stations for efficiency
  - Build the linkage between the technological address and the display.
  - Specify the symbols, colors, and other attributes for each linkage.
  - Create buttons for display selection.
- Describe the use of decision tables

Topics

- Display Elements
  - Worldmaps
    o Segments
    o Views
  - Figures
  - Figure Groups
  - Attribute Groups
  - Decision Tables
  - Icons
  - Variables
    o Analog
    o Digital
    o Local Figures
    o Keybox Linkages
Spectrum Power 4 Parameterization

This course is a combination of lecture, demo and hands-on exercises. It covers the process of identifying and selecting the options (parameters) in Spectrum Power 4 that meet a project's requirements for status processing and the user interface.

General Information
Course Code: E0300
Length: 5 Days

Audience
This course is designed for those who need to map a project's requirements to the parameters available to customize a Spectrum Power 4 system including analysts, designers, integrators, and operators.

Prerequisites
- Familiarity with the project requirements.

Goals
Upon completion of this course, the students shall be able to:
- Describe the database model used in Spectrum Power 4.
- Specify the project's naming convention and assign names to all the components, including real-time data and computer system devices.
- Specify the message texts for alarm and status notifications.
- Specify the characteristics and required processing for each type of information collected and maintained by the system.
- Specify the data to be collected and maintained for each type of device in the power network.
- Specify the automatic checks made by the system when supervisory control actions are initiated by operators or applications.
- Specify the user interface, including:
  - the colors, figures, and attributes used to indicate the state of electrical network components and measurements.
  - the layers of detail presented on one-line diagrams.
  - the buttons and links on displays.
  - the alarm lists and summaries.
- Specify formulas and characteristic curves.
- Specify user access and authorities.
- Size the database to meet the requirements.

Topics
- Overview
- Database Model
- Message Formats
- Message Classes
- Infos and Infotypes
- Elements and Element Types
  - Configuring Digital Elements
  - Configuring Alarm Elements
  - Configuring Analog Elements
  - Configuring Limit Violation Elements
  - Configuring Counter Elements
  - Configuring Tap Position Elements
- Tags and Flags
- Block Types
- Interlock checking
- Network Coloring
- User Interface
  - Prototype Process
  - Terminology and Conventions
  - Images
  - Coloring
  - Dynamic Image Determination
- Value Representation
- Key (Button) Representation
- Info Groups
- Alarm Lists and Summaries
- Toolbars
- Formulas
- Characteristic Curves
- Access Rights and Authorities
- Computer Network Components
- Database Sizing
Historical Information System

Shared Historical Information System Administration

This course is a combination of lecture, demo and hands-on exercises. It provides the basic information necessary to configure, create, and maintain a Shared HIS database.

General Information
Course Code:  E0511a  
Length:  1 Day

Audience
This course is designed for those who will configure, and/or maintain the Historical Information System and for those who require in depth knowledge of the HIS database, including:
- Database Administrators/Engineers
- System Administrators
- Application Programmers

Prerequisites
- Historical Information System Usage

Goals
Upon completion of this course, the students shall be able to:
- Create and maintain an HIS database
- Define backup procedures for HIS data

Topics
- Specifying the points to be collected and the collection attributes
- HIS calculations
  - Defining formulas
  - Defining calculations
  - Viewing calculated data
- Aggregated calculations definitions
- Viewing audit trails
- Using the Basic HIS Configuration and Management Tools to:
  - create the HIS environment
  - maintain the schema
  - backup and restore the HIS database
  - maintain the database
  - initialize HIS
- HIS Replay
- Defining security and access controls
- Describing the flow of HIS data through the system and calculate the resource requirements for HIS data throughout the system
**Historical Information System**

**Shared Historical Information System Usage**

This course is a combination of lecture, demo and hands-on exercises. It provides the basic information necessary to use a Shared HIS database.

<table>
<thead>
<tr>
<th>General Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course Code: E0551u</td>
</tr>
<tr>
<td>Length: 1 Day</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Audience</th>
</tr>
</thead>
<tbody>
<tr>
<td>This course is designed for those who will use the Historical Information System, including:</td>
</tr>
<tr>
<td>• System Operators/Dispatchers</td>
</tr>
<tr>
<td>• Database Administrators/Engineers</td>
</tr>
<tr>
<td>• System Administrators</td>
</tr>
<tr>
<td>• Application Programmers</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Prerequisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>A basic knowledge of Spectrum Power 3, either from the</td>
</tr>
<tr>
<td>• Spectrum Power 3 Overview</td>
</tr>
<tr>
<td>• Spectrum Power 3 Programming</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Goals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upon completion of this course, the students shall be able to:</td>
</tr>
<tr>
<td>• View HIS data through the web interface.</td>
</tr>
<tr>
<td>• Graph the HIS data.</td>
</tr>
<tr>
<td>• Extract data for use by other applications</td>
</tr>
<tr>
<td>• Create and save user defined displays</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Viewing HIS data.</td>
</tr>
<tr>
<td>• Standard HIS displays for Analog, Digital, and Accumulator data</td>
</tr>
<tr>
<td>• Viewing aggregated data</td>
</tr>
<tr>
<td>• Editing HIS data</td>
</tr>
<tr>
<td>• External Interfaces</td>
</tr>
<tr>
<td>• Graphing HIS data</td>
</tr>
<tr>
<td>• Exporting data in several formats</td>
</tr>
<tr>
<td>• User defined displays</td>
</tr>
<tr>
<td>• Creating user defined displays</td>
</tr>
</tbody>
</table>
Transmission Network Applications

Network Model Building

This course provides the participant with an understanding of the power system information required by Network Applications, and needed to develop a network model. Concepts and guidelines for use in preparing a network model are described. Participants gain a clear understanding of how to translate the reduced network model into the format required by the Spectrum Power 3 system.

General Information

Course Code: E0810
Length: 2 Days

Audience

This course is designed for those responsibilities include the collection of network data to be input into a Spectrum Power system, data input, data correction, data integrity, and coordination of data changes, including:
- Data Engineers
- Power System Engineers

Prerequisites

- Participants must have read the network application functional specifications, have a basic understanding of the purpose of network functions, and understand the power network components.

Goals

Upon completion of this course, the students shall be able to:
- Explain the need for a node based and bus based representation of the power system
- Describe the organization of the Spectrum Power Network Model
- List the parameters that define the power system equipment
- Explain how the bus based topology is determined from the node based topology
- List the data required by the State Estimator to find the complete complex voltage solution
- List the data required by Power Flow to find the steady state operation of the power system
- List the data required by Security Analysis to study the steady state operation of the power system under various contingencies
- Describe the guidelines for developing a network model
- Describe error checking
- Explain how a SCADA point is mapped to a piece of equipment in the network

Topics

- Understanding the Power System Data
  - Purpose of Network Applications
  - Network Model Organization
  - Data Defining the Power System Equipment
  - How Network Topology is Determined
  - Data Required by State Estimator
  - Data Required by the Power Flow
  - Data Required by Security Analysis
  - Data Required by Contingency Analysis
- Developing the Network Model
  - Network Model Development Guidelines
  - Error Checking
  - Network to SCADA Point Mapping
  - Network Model Data Examples
Transmission Network Applications
Transmission Network Applications Training

This course provides the participant with skills needed to set up and maintain the Shared Transmission Network Applications (TNA). This course is tailored to cover the applications included in the customer’s system.

General Information
Course Code: E0801
Length: 3-4 Days

Audience
This course is designed for those responsible for maintaining and using the Shared Transmission Network Applications, including:
• Network Engineers
• Power System Engineers
• Programmer/Analysts
• Lead Dispatchers

Prerequisites
• Concepts and theory, basic UNIX usage and comfort with the vi editor are required. The UNIX and vi concepts are covered in the AIX Fundamentals and Basic System Administration

Goals
Upon completion of this course, the students shall be able to:
• Describe important definitions associated with each TNA
• Describe the problem formulation and solution methods associated with each TNA.
• Describe how each TNA interfaces with other TNA and with the Spectrum Power subsytems
• Interpret the input data and output results of each TNA

Topics
• TNA database structure and access
• TNA database generation and population
• TNA source code and executable directories
• For each Transmission Network Application
  – Purpose and features
  – Important definitions
  – Problem formulation
  – Solution methods
  – Interfaces with other TNA and with the rest of the system
• Input data and output results
• User Interface
  – Navigation of main displays
  – Important output results
  – Solution messages
| Distribution Network Applications |

Distribution Network Applications
**DNA Data Modeling and Data Validation**

This course is a combination of lecture, demo and hands-on exercises. It covers the data requirements for the distribution network applications and the use of the Data Validation tool.

### General Information

<table>
<thead>
<tr>
<th>Course Code:</th>
<th>DN010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length:</td>
<td>2 Days</td>
</tr>
</tbody>
</table>

### Audience

This course is designed for those responsible for preparing and validating distribution system data, including:

- Database Administrator/Engineer

### Prerequisites

- Windows usage skills
- DNA system overview
- Basic knowledge of power system equipment and characteristics, and the purpose of such devices as switching devices, capacitors, and transformers.

### Goals

*Upon completion of this course, the students shall be able to:*

- List the data required by the DNA.
- Collect and prepare data for the import process.
- Enter and modify data using IMM.

### Topics

- Overview of data needed for DNA
- Data Attribute Explanations
  - Device-Specific Attributes
  - Lab 1 - Specifying Attributes
- Data Validation
  - Running Data Validation
  - Lab 2 - Examining a Clean Report
  - Interpreting Error Messages
  - Lab 3 - Recognizing Errors
  - Correcting the Data
  - Lab 4 - Correcting DNA Data
DNA Operator/Dispatcher Training

This tailored course provides participants with background information and hands-on practice in using the DNA for optimizing the performance of the distribution system. The workflows that involve the distribution applications are covered. Use of the User Interface, tool bars, and pull-down menus is described. During the lab sessions, participants practice what they have learned. The course is modular, allowing it to be adapted to the specific needs of each customer.

General Information

Course Code: DN101
Length: 1 Day (typical)

Audience

This course is designed for those who will use the DNA to operate the power system, including:
- Operators/Dispatchers
- Operations Engineers

Prerequisites

Participants must have a working knowledge of:
- Personal computers,
- Microsoft Windows user interface,
- Internet Explorer user interface, and
- Distribution system operations principles.

Goals

The goals of the training are adjusted during the tailoring of the course, but typically include being able to:
- Navigate efficiently through the DNA displays.
- Monitor and interpret the data provided by DNA.
- Recognize the situations in which using DNA may be beneficial.
- Initiate a Volt/VAR Control (VVC) analysis.
- Initiate a Optimal Feeder Reconfiguration (OFR) analysis.
- Recognize the location of a fault.
- Initiate a Fault Isolation and Service Restoration (FISR) analysis.
- Run a proposed switching order.

Topics

The topics will vary with the requirements of the project, so this is a sample of the topics that might be covered in the Operator/Dispatcher course.

- Overview of the Distribution Network Application set of functions
- Display Navigation
  - Display Selection
- Responding to Faults
  - Monitoring Alarms
  - Locating the Faulty Equipment
  - Running a FISR Analysis
  - Checking a Switching Order
  - Executing a Switching Order
- Responding to Power System Violations
  - Monitoring State Estimation Results
  - Running a VVC Analysis
  - Running an OFR Analysis
Distribution Network Applications
DNA Overview

This course is designed to provide an overview of DNA's functionality for a specific project. Course content will vary as appropriate. This course is given early in the life of a project and presents the system in broad terms. The course serves as a top level overview of the hardware, the software, the configuration, and the capabilities of the system.

### General Information
- **Course Code:** DN001
- **Length:** 1/2 Day

### Audience
This course is designed for those needing an overview level knowledge of Siemens' Component Distribution Network Applications, including:
- Management needing to know what the system includes.
- Project personnel needing an introduction to the system.

### Prerequisites
- Basic knowledge of power distribution functions and requirements.

### Goals
*Upon completion of this course, the students shall be able to:*
- Describe the system capabilities at a high level.
- Recognize system, hardware, and software terminology.
- Describe the merits of the configuration.
- Identify the needs served by major portions of the configuration.
- Trace the flow of data through the system.

### Topics
- DNA Functions
- Hardware Configuration Overview
- DNA Software Overview
- DNA System Data Flow
- DNA System Design Goals
Distribution Network Applications
Fault Management

This course is a combination of lecture, demo and hands-on exercises. It covers the use and configuration of the Fault Location (FLOC) and the Fault Isolation and Service Restoration (FISR) applications. After simulating a fault, the generated results are examined to reveal the available details about the affected devices and the bounding devices and the possibilities for tuning the analysis process. After selecting the FISR options and running an analysis, the FISR results are examined to reveal the available details about the fault isolation and/or service restoration proposals and the possibilities for tuning this process. The tunable parameters for both applications are explained, and some exercises are conducted to see the effects of various changes. Finally, the management-related tools and techniques are covered to support troubleshooting.

General Information
Course Code: DN202
Length: 3 days

Audience
This course is designed for those responsible for configuring DNA Fault Management applications, including:
- This course is designed for Operation Engineers and Dispatcher Supervisors

Prerequisites
- Web browser basics
- Basics of distribution system modeling and operations

Goals
Upon completion of this course, the students shall be able to:
- Describe the algorithms used in Fault Management.
- Interpret the results generated by FLOC and FISR.
- List the types of fault indicators.
- Configure fault indicators.
- Configure a device’s access difficulty.
- Tune the Fault Management parameters.
- Locate and examine Fault Management log messages.

Topics
- Fault Management Overview
  - Purpose of Fault Management
  - Fault Indicators
  - Data Flow Overview
- Using FLOC with the Web UI
  - Identifying a Fault
  - Simulating a Fault
  - Examining the Basic Results
  - Examining the Detailed Results
  - Lab 1 - Examining FLOC Results
- Using FISR with the Web UI
  - Selecting the FISR Goal
  - Examining the Basic Results
  - Examining the Detailed Results
  - Lab 2 - Examining FISR Results
- Model & Algorithm
  - Overview
  - Tunable FLOC Parameters
    - Lab 3 - Tuning FLOC
      - Configuring Fault Indicators
    - Tunable FISR Parameters
    - Lab 4 - Tuning FISR
      - Configuring Access Difficulty
- External Interfaces
  - Service Oriented Architecture
  - Web-based User Interface
  - Lab 5 - Examining the Interface Files
- Application Management
  - Starting and Stopping
  - Examining Log Files
  - Lab 6 - Debugging
Distribution Network Applications
Load Shed

This course is a combination of lecture, demo and hands-on exercises. It covers the use and configuration of the Load Shed application. The options available to the user are covered to provide a background for discussing the data model and the algorithms used. The process of configuring loads and switches is covered. In addition, the tunable parameters are explained, and some exercises are conducted to see the effects of various changes. Finally, the management-related tools and techniques are covered to support troubleshooting.

General Information
Course Code: DN210
Length: 1 day

Audience
This course is designed for those who are responsible for configuring the Load Shed application, including:
- Operation Engineers
- Dispatcher Supervisors

Prerequisites
- Basics of distribution system modeling and operations

Goals
Upon completion of this course, the students shall be able to:
- Perform manual load shedding functions.
- Perform rotating load shedding functions.
- View the associated Load Shed summary displays.
- Define the loads and switches to be considered by Load Shed.
- Define lists of loads that can be shed.
- Tune the Load Shed parameters.
- Locate and examine Load Shed log messages.

Topics
- Introduction
  - Function Overview
  - Data Flow
- Load Shed Processes
  - Shed/Restore a Single Load
  - Shed/Restore Multiple Loads
  - Shed/Restore a List
  - Shed to a MW Goal
  - Rotating Load Shed
  - View Cold Load Calculation
  - Blocking a Load from Shed Activity
  - Rotating Load Shed Displays
    - RLS Summary Display
    - RLS Feeder Summary
    - Load Shedding Journal Display
  - Lab 1 - "Load Shedding"
- Model & Algorithm
  - Overview
  - Configuring Load Shed
    - Loads and Switches
    - Lists of Loads
  - Lab 2 - Configuring Loads
  - Tunable Parameters
  - Lab 3 - Tuning Load Shed
- External Interfaces
  - Service Oriented Architecture
    - Real-time Data
    - Switching Proposals
- Application Management
  - Starting and Stopping
  - Examining Log Files
  - Lab 4 - Debugging
Distribution Network Applications

Network Management

This course is a combination of lecture, demo and hands-on exercises. It covers the use and configuration of the Isolation and Service Restoration applications used to prepare for planned outages. After selecting the Network Management options and running an analysis, the results are examined to reveal the available details about the isolation and/or service restoration proposals and the possibilities for tuning this process. The tunable parameters are explained, and some exercises are conducted to see the effects of various changes. Finally, the management-related tools and techniques are covered to support troubleshooting.

General Information
Course Code: DN204
Length: 1 day

Audience
This course is designed for those responsible for using and configuring the DNA Network Management application, including:
• Operation Engineers
• Dispatcher Supervisors

Prerequisites
• Web browser basics
• Basics of distribution system modeling and operations

Goals
Upon completion of this course, the students shall be able to:
• Describe the algorithms used in Network Management.
• Interpret the results generated by Network Management.
• Tune the Network Management parameters.
• Locate and examine Network Management log messages.

Topics
• Network Management Overview
  – Purpose of Network Management
  – Data Flow Overview
• Using Network Management with the Web UI
  – Selecting the Goal
  – Examining the Basic Results
  – Examining the Detailed Results
  – Lab 1 - Planning an Outage
• Model & Algorithm
  – Overview
  – Tunable Parameters
  – Lab 2 - Tuning Network Management
• External Interfaces
  – Service Oriented Architecture
  – Web-based User Interface
  – Lab 3 - Examining the Interface Files
• Application Management
  – Starting and Stopping
  – Examining Log Files
  – Lab 4 - Debugging
Distribution Network Applications
Optimal Feeder Reconfiguration

This course is a combination of lecture, demo and hands-on exercises. It covers the use and configuration of the Optimal Feeder Reconfiguration (OFR) application used to satisfy load constraints, minimize power losses, and/or balance transformer loading. After selecting the OFR options and running an analysis, the results are examined to reveal the available details about the reconfiguration proposals and the possibilities for tuning this process. The tunable parameters are explained, and some exercises are conducted to see the effects of various changes. Finally, the management-related tools and techniques are covered to support troubleshooting.

General Information
Course Code: DN211
Length: 1 day

Audience
This course is designed for those who need to adjust the feeder and tie configuration to minimize equipment violations, including:
- Power System Engineers/Analysts
- Operations Engineers
- Dispatcher Supervisors

Prerequisites
- Experience in distribution system operation
- DNA Overview

Goals
Upon completion of this course, the students shall be able to:
- Monitor Distribution System State Estimation (DSSE) results, and detect equipment violations.
- Get familiar with this function, its algorithm, its internal and external interfaces
- Use it in daily operation in order to improve system conditions
- with the OFR function

Topics
- OFR Application Overview
  - Purpose of OFR
  - Included Devices
  - Data Flow Overview
- Using OFR with the Web UI
  - Running an OFR Analysis
  - Examining the Basic Results
  - Comparing Proposals
  - Examining the Detailed Results
  - Lab 1 - Examining OFR Results
- Model & Algorithm
  - Overview
  - Tunable Parameters
  - Lab 2 - Tuning OFR
- External Interfaces
  - Service Oriented Architecture
  - Web-based User Interface
- Application Management
  - Starting and Stopping
  - Examining Log Files
  - Lab 3 - Debugging
Distribution Network Applications

Power Flow and State Estimation

This course is a combination of lecture, demo and hands-on exercises. It covers the use and configuration of the Power Flow / State Estimation (PF/SE) application. After running PF/SE, the generated results are examined to reveal the available details about the power flow and state estimation calculations and the possibilities for tuning the analysis process. The tunable parameters are explained, and some exercises are conducted to see the effects of various changes. Finally, the management-related tools and techniques are covered to support troubleshooting.

**General Information**

Course Code: DN201
Length: 2 days

**Audience**

This course is designed for engineers who need the details to efficiently utilize the DNA functions, including:
- Software Engineers
- Dispatcher Supervisors
- Operation Engineers

**Prerequisites**

- Web browser basics
- DNA system overview
- Basics of distribution system modeling and operations
- Experience in distribution system operation
- C++ programming is an advantage

**Goals**

Upon completion of this course, the students shall be able to:
- List the inputs and outputs of the PF/SE application.
- Manually start a PF/SE calculation.
- Change the parameters that automatically trigger a calculation.
- Describe the PF/SE algorithm.
- Tune the Short Term Load Scheduler parameters to conform to distribution policies.
- Use the log files to analyze the operational details of PF/SE application.
- ...
- ...
- ...

**Topics**

- PF/SE Function Overview
  - Purpose of Power Flow in a DMS
  - Purpose of State Estimation in a DMS
  - Interfaces with the SCADA System
  - Data Flow Overview
- Using PF/SE with the Web UI
  - Running a Calculation
  - Examining the Basic Results
  - Examining the Detailed Results
  - Lab 1 - Using PF/SE
- Model & Algorithm
  - Overview
  - Tunable Parameters
  - Lab 2 - Tuning PF/SE
- PF/SE’s External Interfaces
  - Service Oriented Architecture
  - Web-based User Interface
  - Run-time Query Interface
  - Lab 3 - Examining the Query Data
  - Short Term Load Scheduler
    - Load Model
    - Parameters
    - Lab 4 - Configuring STLS
- Application Management
  - Starting and Stopping
  - Examining Log Files
  - Lab 5 - Debugging
Distribution Network Applications

Short Circuit Calculation

This course is a combination of lecture, demo and hands-on exercises. It provides the information necessary to use and configure the Short Circuit Calculation (SCC) application. After selecting the SCC options and running an analysis, the results are examined to reveal the available details about each analyzed fault type and the possibilities for tuning this process. The tunable parameters are explained, and some exercises are conducted to see the effects of various changes. Finally, the management-related tools and techniques are covered to support troubleshooting.

**General Information**

Course Code: DN213  
Length: 1 day

**Audience**

This course is designed for those..., including:
- This course is designed for Operation Engineers and Dispatcher Supervisors

**Prerequisites**

- Web browser basics
- Basics of distribution system modeling and operations
- C++ programming is an advantage

**Goals**

*Upon completion of this course, the students shall be able to:*
- Understand used model and algorithm
- Utilize all the function’s features in distribution system operations

**Topics**

- SCC Function Overview
  - Purpose of SCC in a DMS
  - Data Flow Overview
- Using SCC with the Web UI
  - Running an Analysis
  - Examining the Basic Results
  - Examining the Detailed Results
  - Lab 1 - Using SCC
- Model & Algorithm
  - Overview
  - Tunable Parameters
  - Lab 2 - Tuning PF/SE
- PF/SE’s External Interfaces
  - Service Oriented Architecture
  - Web-based User Interface
- Application Management
  - Starting and Stopping
  - Examining Log Files
- Lab 5 - Debugging
Distribution Network Applications

Short Term Load Forecast

This course is a combination of lecture, demo and hands-on exercises. It provides the information necessary to configure and monitor the Short Term Load Forecast (STLF) application.

<table>
<thead>
<tr>
<th>General Information</th>
<th>Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course Code: DN212</td>
<td>• STLF Application Overview</td>
</tr>
<tr>
<td>Length: 1 Day</td>
<td>− Purpose of STLF</td>
</tr>
<tr>
<td></td>
<td>− Data Flow Overview</td>
</tr>
<tr>
<td></td>
<td>• Model &amp; Algorithm</td>
</tr>
<tr>
<td></td>
<td>− Overview</td>
</tr>
<tr>
<td></td>
<td>− Defining Zones</td>
</tr>
<tr>
<td></td>
<td>− Lab 1 - Editing Zone Definitions</td>
</tr>
<tr>
<td></td>
<td>− Tunable Parameters</td>
</tr>
<tr>
<td></td>
<td>− Lab 2 - Tuning STLF</td>
</tr>
<tr>
<td>Audience</td>
<td>• External Interfaces</td>
</tr>
<tr>
<td></td>
<td>− Short Term Load Scheduler</td>
</tr>
<tr>
<td></td>
<td>− Weather Data Access</td>
</tr>
<tr>
<td></td>
<td>• Application Management</td>
</tr>
<tr>
<td></td>
<td>− Starting and Stopping</td>
</tr>
<tr>
<td></td>
<td>− Examining Log Files</td>
</tr>
<tr>
<td></td>
<td>− Lab 3 - Debugging</td>
</tr>
</tbody>
</table>

This course is designed for those who need to plan distribution and business processes using Short Term Load Forecast, including:

- Power Engineers

Prerequisites

- Basic knowledge of data modeling
- Basic knowledge of energy business

Goals

Upon completion of this course, the students shall be able to:

- Recognize whether the data model prerequisites are met
- Create short term load forecasts
Distribution Network Applications
Volt/VAR Control

This course is a combination of lecture, demo and hands-on exercises. It covers the use and configuration of the Volt/VAR Control (VVC) application. After running a VVC analysis, the generated results are examined to reveal the available details about the proposals and the possibilities for tuning the analysis process. The tunable parameters are explained, and some exercises are conducted to see the effects of various changes. Finally, the management-related tools and techniques are covered to support troubleshooting.

<table>
<thead>
<tr>
<th>General Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course Code: DN203</td>
</tr>
<tr>
<td>Length: 2 days</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Audience</th>
</tr>
</thead>
<tbody>
<tr>
<td>This course is designed for engineers who need the details to efficiently utilize the DNA functions, including:</td>
</tr>
<tr>
<td>• Software Engineers</td>
</tr>
<tr>
<td>• Dispatcher Supervisors</td>
</tr>
<tr>
<td>• Operation Engineers</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Prerequisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Web browser basics</td>
</tr>
<tr>
<td>• DNA system overview</td>
</tr>
<tr>
<td>• Basics of distribution system modeling and operations</td>
</tr>
<tr>
<td>• Experience in distribution system operation</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Goals</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Upon completion of this course, the students shall be able to:</strong></td>
</tr>
<tr>
<td>• Describe the VVC network model and algorithms.</td>
</tr>
<tr>
<td>• Select the appropriate VVC options to select the desired optimization.</td>
</tr>
<tr>
<td>• Describe the purpose of the VVC tunable parameters and modify them.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>• VVC Application Overview</td>
</tr>
<tr>
<td>• Purpose of Volt/VAR Control</td>
</tr>
<tr>
<td>• Adjustable Devices</td>
</tr>
<tr>
<td>• Data Flow Overview</td>
</tr>
<tr>
<td>• Using VVC with the Web UI</td>
</tr>
<tr>
<td>• Running a VVC Analysis</td>
</tr>
<tr>
<td>• Examining the Basic Results</td>
</tr>
<tr>
<td>• Examining the Detailed Results</td>
</tr>
<tr>
<td>• Lab 1 - Examining VVC Results</td>
</tr>
<tr>
<td>• Model &amp; Algorithm</td>
</tr>
<tr>
<td>• Overview</td>
</tr>
<tr>
<td>• Tunable Parameters</td>
</tr>
<tr>
<td>• Lab 2 - Tuning VVC</td>
</tr>
<tr>
<td>• VVC's External Interfaces</td>
</tr>
<tr>
<td>• Service Oriented Architecture</td>
</tr>
<tr>
<td>• Web-based User Interface</td>
</tr>
<tr>
<td>• Lab 3 - Examining the Interfaces</td>
</tr>
<tr>
<td>• Application Management</td>
</tr>
<tr>
<td>• Starting and Stopping</td>
</tr>
<tr>
<td>• Examining Log Files</td>
</tr>
<tr>
<td>• Lab 4 - Debugging</td>
</tr>
</tbody>
</table>
Just Enough C Programming

This course teaches experienced programmers how to develop and maintain ANSI C language programs. All of the basic features of the language will be explored, including C data types, arrays, pointers and structures; operators, and expressions, flow control constructs, I/O facilities, functions, storage classes and various preprocessor facilities. Extensive lab exercises on the PC will reinforce the lecture materials.

**General Information**

Course Code: E8280  
Length: 3 Days

**Topics**

- Introduction in C.  
- Conditional statements.  
- Loop control statements.  
- Introduction to file I/O. Functions, macros, command line arguments.  
- Storage classes & type definitions.  
- Arrays.  
- Pointers.  
- Dynamic memory allocations overview.  
- Structures, enums and unions.  
- Bitwise operations

**Audience**

Experienced application and system programmers who will write and maintain programs in C, including:
- Software Engineers  
- Programmer/Analysts/DBA

**Prerequisites**

You should be able to write programs in some programming language, such as Pascal, COBOL, Fortran, Assembler or Basic.

**Goals**

At the end of this course participants will have covered the following topics:
- Introduction to the C Programming Language  
- C program syntax  
- Statement types  
- File I/O  
- Program flow  
- Data structures and arrays  
- Pointers  
- Data types and structures
Technology Courses
Just Enough C++ Programming

This course introduces participants to the concepts of object-oriented programming in the C++ environment. Participants gain an understanding of the basics of C++ programming including classes, functions, inheritance, data structures and templates.

General Information
Course Code: E8281
Length: 3 Days

Audience
Programmers and analysts who are responsible for developing and maintaining applications. This course is intended for programmers with C experience, including:
- Software Engineers
- Programmer/Analysts/DBA

Prerequisites
Introduction to C programming - You must have prior experience in C, i.e. a basic understanding of object-oriented programming and a working knowledge of operating system basics (UNIX, MS-DOS) and be comfortable using text editors.

Goals
Upon completion of this course, the students shall be able to:
- Write C++ programs
- Understand C++ Classes
- Understand C++ Class Inheritance
- Understand C++ Data Structures
- Know how to use error and exception processing in C++

Topics
- C++ Classes.
- Overloading.
- Constructors and Destructors.
- Exception Handling.
- Inheritance.
- C++ I/O.
Technology Courses

Just Enough FORTRAN Programming

This course trains participants to write programs in Fortran 90. Modular top-down design and structured programming are emphasized.

While Fortran 90 is a superset of FORTRAN 77, some of the language features that come from FORTRAN 77 are considered to be obsolete. These features, which are candidates for removal from the next language revision, are not taught. Procedures are introduced at the beginning of the course. Modules are emphasized as a way of providing interfaces to procedures.

General Information

Course Code: E8293
Length: 3 Days

Audience

Programmers needing the ability to read and write Fortran 90 programs, including:
- Software Engineers
- Programmer/Analysts/DBA

Prerequisites

Basic knowledge of using a computer is assumed. Some programming experience is desirable.

Goals

Upon completion of this course, the students shall be able to:
- Read and write Fortran 90 programs

Topics

- Introduction in FORTRAN.
- Conditional statements.
- Loop control statements.
- File I/O.
- Functions, macros, and arguments.
- Arrays.
- Memory allocations overview.
- Structures and enumerations.
- Bitwise operations
Technology Courses

Just Enough Pascal Programming

This course provides the participant with the information needed to program in PASCAL in the Spectrum Power 3 environment. This is a beginning PASCAL programming course, which presumes no prior experience with the language.

General Information

Course Code: E8295
Length: 3 Days

Audience

Software engineers responsible for creating or modifying programs in the PASCAL language, including:
- Software Engineers
- Programmer/Analysts/DBA

Prerequisites

A working knowledge of programming.

Goals

Upon completion of this course, the students shall be able to:
- Describe the PASCAL program structure.
- Use data, expressions, and the assignment statement.
- Use control statements, including Boolean and case statements.
- Use procedures and functions.
- Use arrays, structured elements, sets, and strings.
- Do simple file I/O, and describe the PASCAL I/O capabilities.
- Describe the pointer and dynamic storage allocation capability.
- Write a PASCAL program.
- Use PASCAL compiler directives.

Find the rules and recommendations for PASCAL coding standards.

Topics

- Introduction in PASCAL.
- Conditional statements.
- Loop control statements.
- Introduction to file I/O.
  Functions, macros, arguments.
- Storage classes & type definitions.
- Arrays.
- Pointers.
- Dynamic memory allocations overview.
- Structures, enums and unions.
- Bitwise operations

Introduction in PASCAL.

Conditional statements.

Loop control statements.

Introduction to file I/O.
  Functions, macros, arguments.

Storage classes & type definitions.

Arrays.

Pointers.

Dynamic memory allocations overview.

Structures, enums and unions.

Bitwise operations
Secure Coding

The purpose of this course is to introduce the student to the primary causes of commonly exploited software vulnerabilities and discuss secure coding practices that should be followed to reduce or eliminate these vulnerabilities in their own applications.

**General Information**
- Course Code: SeCode
- Length: 4 Hours

**Audience**
- Database Administrators
- Application Developers

**Prerequisites**
- Basic knowledge of web technologies (html, javascript, etc)
- Basic knowledge of databases
- Basic knowledge of programming

**Topics**
- Security Introduction
- Cross-Site Scripting
- SQL Injection
- Command Injection
- Parameter Manipulation
- Security Concepts
- Authentication
- PERL Security
- C, C++ Security
- Java Security

**Goals**

*Upon completion of this course, the students shall be able to:*
- Describe the issue in each topic
- Give specific examples of each issue
- Describe the secure coding practice that should be used in each case
Applications Data Engineering Workshop

This course provides practical experience preparing and entering application data for the EMS system. The workshop will take place after the formal training and discuss the project’s implementation of the skills learned.

**General Information**
- **Course Code:** ADW
- **Length:** 2 Days

**Audience**
Data engineers whose responsibilities include the collection of data to be input into Spectrum Power 3, data input, data correction, data integrity, and coordination of data changes.

**Prerequisites**
Spectrum Power 3 Database Maintenance
Data Modeling

**Goals**
*At the end of this course, participants will be able to:*
- Prepare input for the EMS from Project data.
- Produce reports of the database data.
- Compare the data in the Project's database to the Project's specification of the data.

**Topics**
- Review topics covered in formal training
- Identify data requirements
- Prepare data for input
- Discuss protocols
- Compare project data with Spectrum Power 3 requirements
- Develop action plan
- Define implementation schedule
Data Engineering Workshops

Display Generation Data Engineering Workshop

This course provides practical experience creating user interface displays for the EMS system. The exercises will incorporate actual Project data and will use the graphical and textual options chosen by the Project.

General Information

Course Code: DGW
Length: 2 Days

Audience

Data engineers whose responsibilities include the collection of data to be input into Spectrum Power 3, data input, data correction, data integrity, and coordination of data changes.

Prerequisites

- Spectrum Power 3 Display Building

Goals

At the end of this course, participants will be able to:
- Create new displays modeled on project prototype displays.
- Use the graphical elements and attributes chosen by the project.

Topics

- Review topics covered in formal training
- Identify display requirements
- Prototype displays
- Discuss displays, elements, and attributes
- Compare project displays with Spectrum Power 3 requirements
- Develop action plan
- Define implementation schedule
Data Engineering Workshops

Historian Data Engineering Workshop

This workshop provides practical experience specifying and processing the archived data from the EMS system. The exercises will incorporate actual project’s data.

<table>
<thead>
<tr>
<th>General Information</th>
<th>Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course Code: HDW</td>
<td>• Review topics covered in formal training</td>
</tr>
<tr>
<td>Length: 2 Days</td>
<td>• Identify project’s data to be archived</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Audience</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data engineers whose responsibilities include the collection of data to be input into <strong>Spectrum Power 3</strong>, data input, data correction, data integrity, and coordination of data changes.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Prerequisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>• HIS Administration and Usage</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Goals</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>At the end of this course, participants will be able to:</em></td>
</tr>
<tr>
<td>• Specify the project’s data to archived.</td>
</tr>
<tr>
<td>• Produce reports of the archived data.</td>
</tr>
</tbody>
</table>
**Data Engineering Workshops**

**Operator Training Simulator Data Engineering Workshop**

This course provides practical experience preparing and entering Operator Training Simulator (OTS) data for the EMS system. The exercises will incorporate actual project data.

### General Information

<table>
<thead>
<tr>
<th>Course Code:</th>
<th>OTW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length:</td>
<td>2 Days</td>
</tr>
</tbody>
</table>

### Audience

- Data engineers whose responsibilities include the collection of OTS data to be input into Spectrum Power 3, data input, data correction, data integrity, and coordination of data changes.

### Prerequisites

Spectrum Power 3 Data Modeling

### Goals

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

- Prepare input for the OTS from the project’s data.
- Produce reports of the database data.
- Compare the data in the OTS database to the project’s specification of the data.

### Topics

- Review topics covered in formal training
- Identify data requirements
- Prepare data for input
- Compare project data with Spectrum Power 3 requirements
- Develop action plan
- Define implementation schedule
**SCADA Data Engineering Workshop**

This course provides practical experience preparing and entering SCADA data for the EMS system. The exercises will incorporate actual project data.

### General Information
- **Course Code:** SDW
- **Length:** 2 Days

### Audience
- Data engineers whose responsibilities include the collection of data to be input into **Spectrum Power 3**, data input, data correction, data integrity, and coordination of data changes.

### Prerequisites
- **Spectrum Power 3 Data Modeling**

### Goals
*At the end of this course, participants will be able to:*
- Prepare input for the EMS from the project’s data.
- Produce reports of the database data.
- Compare the data in the EMS database to the project’s specification of the data.

### Topics
- Review topics covered in formal training
- Identify data requirements
- Prepare data for input
- Compare project data with **Spectrum Power 3** requirements
- Develop action plan
- Define implementation schedule
Siemens supports a role based training curriculum. With this approach we structure our training offerings to compliment the implementation cycle. The Spectrum PowerCC course descriptions utilize Job Roles as the target audience, as well as noting prerequisite activities.

Detailed below are the core Job Roles and Primary training components:

<table>
<thead>
<tr>
<th>Job Role</th>
<th>Job Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Management</td>
<td>Decision making at all product levels</td>
</tr>
<tr>
<td>Database Administrator/Engineer</td>
<td>Responsible for defining the structure of the database, trouble shooting,</td>
</tr>
<tr>
<td></td>
<td>database backup / restore, define content data, data migration activities</td>
</tr>
<tr>
<td>System Administrator</td>
<td>Responsible for installation of PowerCC software incl. 3rd party products,</td>
</tr>
<tr>
<td></td>
<td>security of the system, system upgrade, tracking of problem reports</td>
</tr>
<tr>
<td>Communications Administrator</td>
<td>Responsible for communication lines, setup of communication servers</td>
</tr>
<tr>
<td>Application Programmer</td>
<td>Responsible for the application logic, data requirements</td>
</tr>
<tr>
<td>Operator/Dispatcher</td>
<td>Responsible for operating the applications</td>
</tr>
<tr>
<td>Database Entry</td>
<td>Responsible for the data entry.</td>
</tr>
<tr>
<td>Display Builder</td>
<td>Responsible for display building</td>
</tr>
<tr>
<td>System Hardware Maintainer/Adm</td>
<td>Responsible for replacement of hardware, diagnosis, repairs, system backup /</td>
</tr>
<tr>
<td></td>
<td>restore, spare parts, LAN definitions, commissioning of installed HW and SW</td>
</tr>
</tbody>
</table>
The Siemens Training Plan consists of three primary components:

- **Prerequisite activities** - completed remotely
  - Third-party training courses
  - Self-Study (CBT)
  - Tutorial
  - Documentation

- **Classroom Training** - completed in a classroom environment
  - Modular format
  - Intensive hands-on-labs
  - Lecture
  - Use of Reference and Technical Guides

- **On-The-Job Training** – Resident and On-Site Activities
  - “Resident” customer staff will work with Siemens staff for the duration of the project.
  - Other designated customer staff will be assigned incremental training during the project.