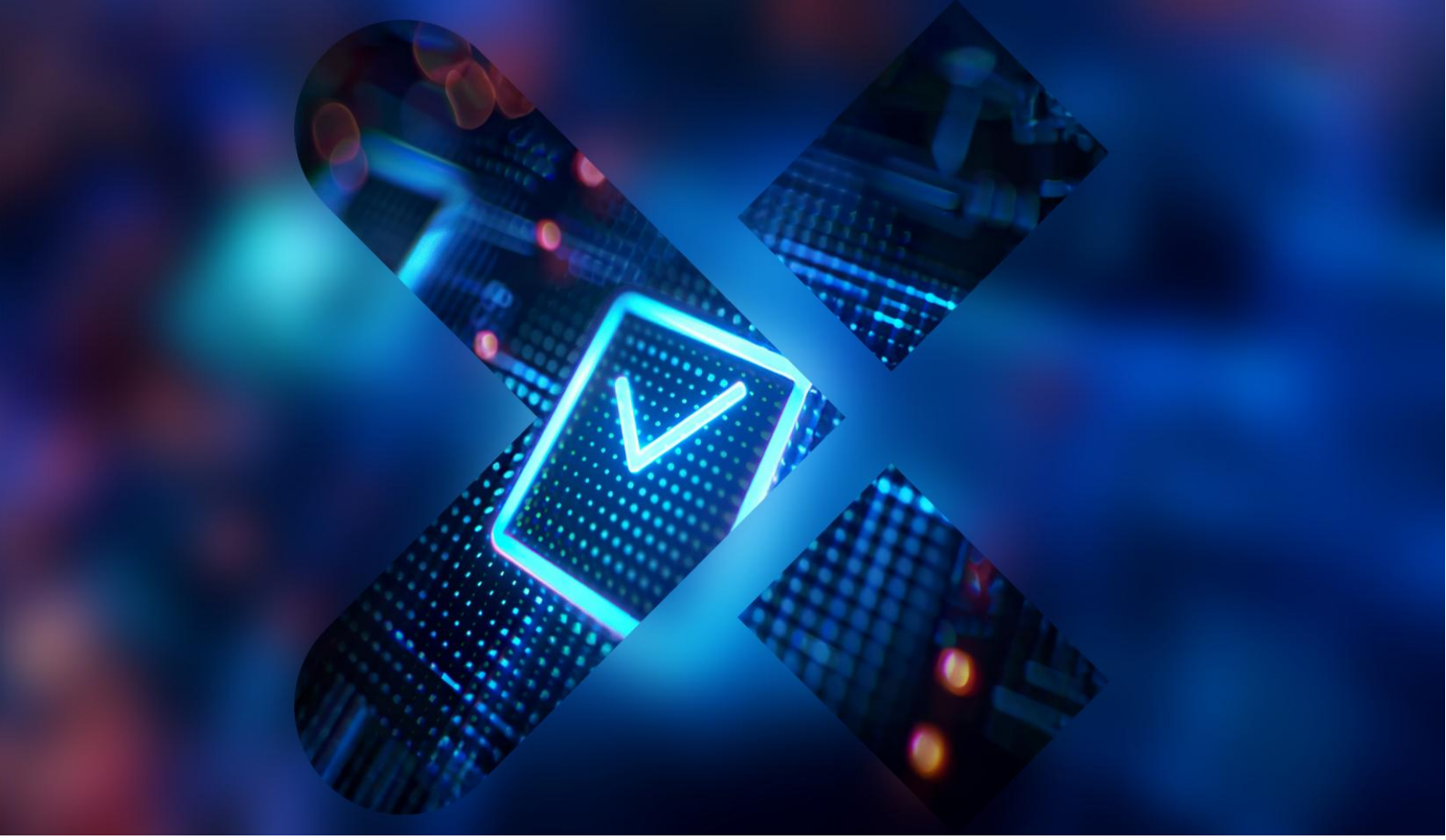


GRID SOFTWARE UNIVERSITY

Spectrum Power 7

Course Catalogue

Document : GSW-U-SP7

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1. Spectrum Power Training

1.1 Introduction

Employee development is a key factor in mastering the energy transformation and digitalization challenge. Siemens understands the importance of having adequately trained personnel for reliable and safe network management and operation.

Siemens has developed a broad set of courses specifically to train our customer on Spectrum Power, as well as on operational and situational aspects related to control centers. Our training program utilizes a hands-on approach integrating a role-based methodology throughout the curricula.

1.2 Training Program

Spectrum Power Training Courses are arranged into categories based on common roles and responsibilities of the typical electrical power utility business. This structure is offered as a guideline to assist customers in developing the best training plan with the support of Siemens for their employees, thereby providing a value-added approach.

Spectrum Power Overview – Provides a high-level overview of the system, software architecture and hardware of the Spectrum Power system; it is primarily for Project Managers, Senior Management, and administrative support personnel who require a comprehensive high-level overview or introduction of the Spectrum Power system.

Operation & Dispatching – Operator/Dispatcher training typically planned in coordination with the project teams for those who need to learn to operate the system.

Database and Display – Technical classes that teach how to enter, edit, and maintain a Spectrum Power database and build graphical displays.

System Administration and Communications – Technical instruction focused on the administrative duties required for the Spectrum Power applications and the configuration, administration, and use of communication protocols.

Applications – Courses that focus on a variety of power systems applications.

Workshops – Workshops span a variety of topics and are developed based on customer specific requirements. Workshops are not part of the standard Spectrum Power courses. They require special scheduling arrangements and are priced based on requirements and necessary preparation.

1.3 Language

Our courses are available in English or German. You can see the available languages in the general information section of each specific course. For classes in any other language, an interpreter might be necessary, and course customization charges might apply. Customers with language translation requirements should contact Siemens Training Deparent.

1.4 Delivery Methods

Our courses are available via multiple delivery methods:

Classroom	Instructor-led training session at a formal classroom setting at Siemens
Remote	Live, Instructor-led training session given via online conferencing tools
On-Site	Instructor-led training session provided at the customer facility in a training environment supplied by the customer
eLearning	Pre-recorded training session provided on demand
Blended Learning	A combination of eLearning and instructor led training
On-The Job	Execute tasks and get hands-on experience, under the supervision of a trainer

You can see the suggested roles in the target audience section of each specific course.

1.5 Role Based Training

Siemens supports a role-based training curriculum. The course descriptions specify Job Roles as the target audience, as well as noting prerequisite skills. Job roles are associated with job activities. Often one person will fulfill multiple job roles and will benefit from the training recommended for each role.

Job Role	Job Activities
Management	Making decisions at all product levels
Database Administrator/ Engineer	Defining the structure of the database, trouble shooting, defining data, coordinating data migration activities, backing up and restoring the database
System Administrator	Installing and upgrading the software incl. 3rd party products, ensuring the security of the system, tracking of problem reports
System Hardware Maintainer/Administrator	Installing, testing, and commissioning the hardware, diagnosing problems, maintaining spare parts
Application Programmer	Specifying, designing, and/or implementing the application logic and data requirements
Operator/Dispatcher	Operating the process system using the application software

You can see the suggested roles in the target audience section of each specific course.

1.6 Training Material

Training materials are specifically developed for Spectrum Power training courses. Siemens shall provide all necessary training materials, including course manuals and reference material in hard copy and/or PDF (Portable Document Format) files. Each trainee shall receive individual copies of the training materials. The contents of Spectrum Power training materials are confidential and proprietary, and usage is protected by Siemens copyright and to be used for internal use only.

1.7 Course registration and Contact information.

Registration requests for instructor led trainings should be submitted to the Training Center no later than 15 business days prior to the scheduled begin date of any class. To ensure adequate access to the laboratory equipment, enrollment in many of the classes is limited. Seating for classes is reserved in the order that requests are received.
For registration, or if you want to get more information about our courses or have special training requests, please reach out to your local Siemens sales partner, or contact us directly at gridsoftware-training@siemens.com

1.8 Cancellation Policy

Siemens may cancel classes with less than the minimum of five (5) registered students, no less than two weeks prior to the scheduled start of that class. Any enrolled students would be notified of the cancellation and optionally rescheduled for a later offering.
Customer cancellation of student enrollments received less than two weeks prior to the start of the class will be subject to a cancellation fee equal to 50% of the tuition. If an enrolled student fails to appear for a scheduled class, a cancellation fee equal to 100% of the tuition will be charged.
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2. Spectrum Power Overview Courses

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2.1 SP7 – Overview

Objectives

This course describes the purpose and features of the base software applications.

General Information

Course Code	GSW-U-SP7-OV
Delivery Method	Classroom, Remote, On-Site
Duration	4 Hours
Language	English or German

Target Audience

This course is designed as an introduction to Spectrum Power 7.

Roles: Managers, Supervisors, System Administrators, Software Engineers, Programmer/Analysts/DBA, Operations

Prerequisites

- None

Content

Introduction to:

- Spectrum Power 7 configuration, data transmission, and communications.
- Information used in the Spectrum Power 7 system.
- The user interface.
- SCADA and historical data information capabilities.
- The relationships of the applications within Spectrum Power 7 along with key user interfaces.

Note

SP7- Management Overview and SP7 – Hardware Overview are components of the SP7 Overview.

2.2 SP7 – Management Overview

Objectives

Tailored for each customer by the customer's project team, 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.

General Information

Course Code	GSW-SP7-MOV
Delivery Method	Classroom, Remote, On-Site
Duration	2 Hours
Language	English or German

Target Audience

This course is targeted Management needing to know what the system includes project personnel needing an introduction to the system.
Roles: Management

Prerequisites

- None

Content

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

2.3 SP7 – Hardware Overview

Objectives

Tailored for each customer by the customer's project team, this course covers the project's hardware configuration.

General Information

Course Code	GSW-U-SP7-HOV
Delivery-Method	Classroom, Remote and On-Site
Duration	2 hours
Language	English or German

Target Audience

This course is designed for those who are interested in the hardware configuration of the delivered system.
Roles: Managers, Supervisors, Engineers, Technicians, System Administrators, Software Engineers, Programmer/Analysts/DBA

Prerequisites

- None

Content

- Hardware configuration
- Server functions
- Redundancy issues
- Diagnostic functions
- Configuration Utilities

3. Operation & Dispatching Courses

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3.1 SP7 Operator/Dispatcher Training

Objectives

This tailored course provides participants with background information and hands-on practice in operating the energy management system. System configuration and functionality are covered, with emphasis on application programs used in operating the power system. Use of the primary window, toolbars, and pull-down menus is described (software details and terminology are minimized). 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 management system.

General Information

Course Code	GSW-U-SP7-OPER
Delivery Method	Classroom, Remote, On-Site
Duration	3-5 Days
Language	English or German

Target Audience

This course is targeted for all who are responsible for observing and operation of power system control centers and need to operate and handle daily system operation.
Roles: Operators/Dispatchers, Operations Engineers

Prerequisites

- Participants should be familiar with the basics of an energy management system.
- Familiarity with typical Windows (or Linux) operations is also assumed

Content

The training will be tailored according to the in-scope functionality and may include:

- Display Navigation
- 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
- Historical Data Collection (& Energy Accounting)
- Automatic Generation Control
  - ACE and frequency
- Network Applications
  - State Estimator
  - Security Analysis
  - Operator Power Flow
  - Interchange Scheduler
  - System Load Forecast
  - Outage Scheduler
- Emergency Applications
  - Manual & Rotating Load Shed

3.2 SP7 Operator-Train the Trainer

Objectives

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

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General Information

Course Code	GSW-U-SP7-OPER_TTT
Delivery Method	Classroom, Remote, On-Site
Duration	3 Days
Language	English or German

Target Audience

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

Roles: Operators/Dispatchers Trainers

Prerequisites

- Spectrum Power 7 Operator/Dispatcher Training
- Spectrum Power 7 testing On the Job Activities recommended

Content

- Trainer Fundamentals
  - Review materials
  - Classroom
  - How People Learn
  - Training Skills
  - Communication Skills
- System Overview
- Navigation
- Log-on steps
- Additional interfaces
  - 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.

3.3 SP7 Operator Training Simulator (OTS)

Objectives

This course provides participants with background information and hands-on practice in using the Spectrum Power 7 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	GSW-SP7-OPER_OTS
Delivery Method	Classroom, Remote, On-Site
Duration	3 Days
Language	English or German

Target Audience

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

Prerequisites

- Spectrum Power 7 Overview
- Spectrum Power 7 testing On the Job Activities recommended

Content

- 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

4. Database & Display Building Courses

4.1 SP7 Database Fundamentals - Introduction

Objectives

To understand the Spectrum Power™ 7 data entry process and data entry process.

General Information

Course Code	GSW-U-SP7-DBF
Delivery Method	Classroom, Remote, On-Site
Duration	1 Day
Language	English or German

Target Audience

Persons who independently perform network data entry.

Roles: Database Administrator/Engineer, Database Entry, Display Builder

Prerequisites

- Spectrum Power 7 Overview

Content

- Introduction to Spectrum Power™ 7 database terminology
- Introduction to job management and IMM
- Identify and describe standard database views
- Using predefined structures
- Description of analog values
- Enter new data into the database
- The editing process for new and existing database use cases
- Import and export of technological data, Description of switch bay structure

4.2 SP7 Database & Data Model Engineering

Objectives

To understand the Spectrum Power™ 7 data entry process and independently perform data entry and verification.

General Information

Course Code	GSW-U-SP7-DBE
Delivery Method	Classroom, Remote, On-Site
Duration	1 Day
Language	English or German

Target Audience

This course is designed for those who are responsible for the collection of data to be input into Spectrum Power 7, data input, data correction, data integrity, and coordination of data changes,
Roles: Database Administrator/Engineer, Database Entry, Display Builder

Prerequisites

- Spectrum Power 7 Overview

Content

- Spectrum Power 7 Data Entry Management
  - Technological Address
  - Topology Types and Network Components
  - Data Definition Editors
- Database editor search techniques
- Database views are required to define SCADA telemetry devices such as RTUs and associated analog, status, and accumulator point data.
- Configure an RTU and related database items in the training environment
- View the newly defined RTU and related telemetry points via the standard dynamic data display

4.3 SP7 Network Diagram Construction - Introduction

Objectives

This course introduces the concepts of the SP7 Graphic Editor and the display building process. It introduces sample use cases for the creation and maintenance of displays.

General Information

Course Code	GSW-U-SP7-GEDI
Delivery Method	Classroom, Remote, On-Site
Duration	1 Day
Language	English or German

Target Audience

This course is designed for those who are responsible for the display building and maintenance into SP 7,
Roles: Database Administrator/Engineer, Database Entry, Display Builder, Application Programmer

Prerequisites

- Spectrum Power 7 Overview
- Spectrum Power 7 Database & Data Model Fundamentals

Content

- Understand the difference between auto generated and converted displays
- Identify and utilize the various display tools available for creating Network Diagrams (schematics and geographics)
- Review Graphic editor process

4.4 SP7 Network Diagram Construction - Engineering

Objectives

This course describes the display building process using the Spectrum Power 7 graphic editor. It provides practice in building one-line diagrams and editing displays. Associating database values with display variables.

General Information

Course Code	GSW-U-SP7-GEDE
Delivery Method	Classroom, Remote, On-Site
Duration	2 Days
Language	English or German

Target Audience

This course is designed for those who are responsible for the display building and maintenance into SP 7,
Roles: Database Administrator/Engineer, Database Entry, Display Builder, Application Programmer

Prerequisites

- Spectrum Power 7 Overview
- Spectrum Power 7 Database & Data Model Fundamentals
- Spectrum Power 7 Network Diagram Construction y – Introduction

Content

- Build energy management displays
- Use base display tools and features
- Create system overview displays
- Modify existing displays
- Create commonly used electrical devices and display dynamic cross references
- Create a template
- Apply a template
- Testing displays
- Scheduling displays

4.5 SP7 Historical Information System (HIS) Usage

Objectives

Participants gain basic knowledge of the functions of the “Historical Information System HIS,”.

General Information

Course Code	GSW-U-SP7-HISU
Delivery Method	Classroom, Remote, On-Site
Duration	1 Day
Language	English or German

Target 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.

Roles: Database Administrators/Engineers, System Administrators, Application Programmers, System Operators, Corporate Data Analysts

Prerequisites

- Spectrum Power 7 Overview

Content

- Viewing HIS data
- HIS Replay
- Editing HIS data
- User-defined displays
- HIS calculations
- Viewing audit trails
- External Interfaces
- Security and access controls (AORs)
- HIS configuration including aggregation and compression
- Data flow through HIS
- Monitoring tools

4.6 SP7 Historical Information System (HIS) Administration

Objectives

Participants gain basic knowledge and skills to conduct daily HIS Administration and support.

General Information

Course Code	GSW-U-SP7-HISA
Delivery Method	Classroom, Remote, On-Site
Duration	1 Day
Language	English or German

Target Audience

This course is designed for those who will support, paramaterize and maintain the Historical Information System and for those who require in-depth knowledge of the HIS database.

Roles: Database Administrators/Engineers, System Administrators, Application Programmers, System Operators, Corporate Data Analysts

Prerequisites

- Spectrum Power 7 Overview
- Spectrum Power 7 HIS Usage

Content

- Redundancy
- Corporate HIS
- Zoning
- Aggregation
- Compression types
- Second Timestamp --> configurator
- Health monitoring tool
- Main HIS processing
- Multisite/Gap fill discussion
- Corp HIS (population, data latency, security, users)
- Incoming HIS interfaces
- SP7 External Interfaces (outgoing)
- HIS troubleshooting
- Installation, configuration, redundancy: RMAN and Dataguard
- HIS Database setup
- HIS installation
- Upgrade considerations
- Debug scripts
- Monitoring tools

5. System Administration & Communications Courses

5.1 SP7 Administration - Basic

Objectives

The participants will gain basic knowledge about the hardware and software configuration of Spectrum Power™ 7 system administration and some related security aspects (of the same).

General Information

Course Code	GSW-U-SP7-ADMB
Delivery Method	Classroom, Remote, On-Site
Duration	1 Day
Language	English or German

Target Audience

This course is designed for those responsible for maintaining and enhancing the Spectrum Power™ 7 Applications.
Roles: System Administrators, Utility Trainers

Prerequisites

- Spectrum Power 7 Overview
- General Operating System Knowledge

Content

- Identify Spectrum hardware configuration
- Identify location of hardware components of the system
- System navigation and general administration
- Patch management
- GIT

5.2 SP7 Administration - Advanced

Objectives

Provide an overview of user administration and system maintenance. Following this course, the student will be able to independently create backups, maintain the system, and perform initial system diagnostic steps of problems and provide administrative support.

General Information

Course Code	GSW-U-SP7-ADMA
Delivery Method	Classroom, Remote, On-Site
Duration	4 Days
Language	English or German

Target Audience

This course is designed for those responsible for maintaining and enhancing the Spectrum Power™ 7 Applications.
Roles: System Administrators, Utility Trainers

Prerequisites

- Spectrum Power™ 7 Overview
- General Operating System Knowledge
- Spectrum Power™ 7 Administration Basic

Content

- Ability to run on-line diagnostic tests and interpret results
- Ability to identify the components of the Servers and Disk Units and perform basic maintenance
- Ability to install Spectrum Power™
- Acquire basic knowledge of Oracle
- Ability to deploy patches
- System backup and restore

5.3 SP7 Communications, Independent Front End (IFS) - Basic

Objectives

Participants gain basic knowledge of the functions of the “Independent Front End (IFS)”.

General Information

Course Code	GSW-U-SP7-IFSB
Delivery Method	Classroom, Remote, On-Site
Duration	1/2 day
Language	English or German

Target Audience

This course is designed for those who need to configure and maintain the Independent Front-End System and anyone who independently maintains RTU communications and is responsible for new RTU data integration.
Roles: Communications Administrators, System Hardware Maintainers/Administrators, Operations Support Personnel

Prerequisites

- Fundamental Data Communication Knowledge
- Familiarity with RedHat Enterprise Linux (RHEL)
- Familiarity with Spectrum Power™ 7 database fundamentals

Content

- Independente Front End System
  - Overview
  - Base Functions
  - Protocols Supported
  - Highlights
- Configuration and Redundancy
  - Topology
  - IP and Serial Connections
  - IFS Hardware
  - Redundancy
  - Slave Function
- User Interface
  - IFS Status Display
    - IFS Analog Trend UI
- IFS IMM Model
  - Model Management
  - IfsPair
  - IfsChannel
  - IfsRtu
  - IfsPoints
  - IfsSg
- Exercises

5.4 SP7 Communications, Independent Front End (IFS) - Advanced

Objectives

Participants gain an advanced knowledge of the functions of the “Independent Front End (IFS)”.

General Information

Course Code	GSW-U-SP7-IFSA
Delivery Method	Classroom, Remote, On-Site
Duration	1/2 day
Language	English or German

Target Audience

This course is designed for those who need to configure and maintain the Independent Front-End System as well as anyone who independently maintains RTU communications and is responsible for new RTU data integration.
Roles: Communications Administrators, System Hardware Maintainers/Administrators, Operations Support Personnel

Prerequisites

- Fundamental Data Communication Knowledge
- Familiarity with Spectrum Power™ 7 database fundamentals
- Completed Independent Front-End Basics

Content

- User Interface – Advanced Concepts
  - Editing
  - Line Information
  - Search/Sort Mode
  - Context Menus
  - IFS TraceUI
  - Analog Trend Display
- Parameterization, Utilities, Debugging Tools
  - Relations
  - System Sizing Parameters
  - Trace Utility
  - IFS Utility
- IFS Command Utility
- IFS Design
  - Main Programs
  - Components
  - Folders
- Protocol Overview
  - IEC101 and IEC014
  - DNP3
  - TG8979
  - Conitel 2020
  - IEEE C37.118 Synchrophasor Protocol
  - Modbus RTU
  - Modbus TCP/IP
  - Exercises

5.5 SP7 Communications, Inter-Control Center Communications Protocol (ICCP)

Objectives

This course provides the participant with detailed knowledge of the Spectrum Power 7 ICCP implementation.

General Information

Course Code	GSW-U-SP7-ICCP
Delivery Method	Classroom, Remote, On-Site
Duration	1 Day
Language	English or German

Target Audience

This course is designed for those responsible for maintaining ICCP communications in a Spectrum Power 7 system.

Roles: Software Engineers, Communications Engineers

Prerequisites

- Spectrum Power 7 Overview
- Spectrum Power 7 Database & Data Model Fundamentals

Content

- Overview
  - Protocol
  - Conformance Blocks
- Configuration
  - Links
  - Data Points
  - SISCO
- Program Functionality
  - Data Input and Output
  - Network Control
  - Data Link Management
  - System Interfaces
- Troubleshooting

5.6 SP7 Communications, DNP3

Objectives

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	GSW-U-SP7-DNP3
Delivery Method	Classroom, Remote, On-Site
Duration	1 Day
Language	English or German

Target Audience

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

Prerequisites

- Prior experience of any Byte oriented Protocol communications.

Content

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

5.7 SP7 Utilities

Objectives

Participants gain basic knowledge about some core SP7 support utilities.

General Information

Course Code	GSW-U-SP7-UT
Delivery Method	Classroom, Remote, On-Site
Duration	4 hours (1/2 day)
Language	English or German

Target Audience

This course is designed for those who are responsible for administering and using SP7.

Roles: System Administrators, Network Administrators, Information Technology (IT) Personnel, Operations Technology (OT) Personnel

Prerequisites

- Familiarity with Red Hat Enterprise Linux (RHEL) systems, basic Linux usage, system, and network administration

Content

- Utilities Overview
-

5.8 SP7 Independent Health Monitor

Objectives

Participants gain basic knowledge of the functions of the Independent Health Monitor (IHM).

General Information

Course Code	GSW-U-SP7-IHM
Delivery Method	Classroom, Remote, On-Site
Duration	1 Day
Language	English or German

Target Audience

This course is designed for those who are responsible for administering and using the Independent Health Monitor.
Roles: System Administrators, Network Administrators, Information Technology (IT) Personnel, Operations Technology (OT) Personnel

Prerequisites

- Familiarity with RedHat Linux systems, basic RedHat Linux usage, system, and network administration

Content

- IHM System Overview
- IHM Installation
- IHM Configuration
- IHM Operation
- IHM Administration / Ongoing Maintenance
- Patch Management

5.9 SP7 Security

Objectives

This course provides participants with the skills to configure Spectrum Power 7 to conform to deregulation and system security requirements. The deregulation-related topics focus on configuring the Spectrum Power 7 User Interface to manage access to the system. The system security topics focus mainly on the Spectrum Power 7 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 7 utilities.

General Information

Course Code	GSW-U-SP7-SEC
Delivery Method	Classroom, Remote, On-Site
Duration	2 Days
Language	English or German

Target Audience

This course is designed for those who are responsible for administering Spectrum Power 7.
Roles: System Administrators, Network Administrators, Information Technology (IT) Personnel, Operations Technology (OT) Personnel

Prerequisites

- Spectrum Power 7 Overview
- Spectrum Power 7 Administration – Basics
- Spectrum Power 7 Administration – Advanced

Content

- System Overview
- System Security
- Security Risks
- Hardening Operating System
  - Trusted Computing Base
  - Securing the System Logs
  - Disabling and Restricting Services
- Hardening Oracle
  - Username/Password Management
  - Patch Management
- User Access Control
- Technological Areas
- Message Classes
- Basic Signaling Window Assignment
- Network Security
  - Network Applications
  - Server Network Connections
  - SCADA Network Connections
  - Firewalls
- User Interface Access Controls
- Authorities
  - Assigning Authorities
    - Console Assignments
    - User Assignments
    - Window Group Assignments
  - Enforcing Authorities
    - Login/Logout
    - Relations
    - Display Callup
    - Program Checks
    - Monitoring Changes

6. Applications Courses

6.1 SP7 Multisite

Objectives

This course provides the participant with detailed knowledge of and hands-on experience with the Spectrum Power 7 Multisite implementation.

General Information

Course Code	GSW-U-SP7-MS
Delivery Method	Classroom, Remote, On-Site
Duration	1 Day
Language	English or German

Target Audience

This course is designed for those responsible for maintaining Multisite Software in a Spectrum Power 7 system.
Roles: Software Engineers, Communications Engineers, and Programmer/Analysts

Prerequisites

- Common knowledge in (Microsoft Windows or RedHat Linux) system administration
- Basic knowledge in Spectrum Power™ 7 operation and data engineering
- Completed training in data engineering is proposed (Database Fundamentals encouraged)

Content

- Overview
- Multisite Configuration
  - Configuring Servers
  - Configuring Control Centers
  - Configuring Connections
- Data Distribution
  - Synchronizing the Runtime Files
  - Synchronizing Databases
- Database Maintenance
  - Specifying Shared Database Blocks
  - Specifying Shared Infos
- Data Base Model
  - The Database Structure
  - Data Types
  - Normelements
  - Elements and Element Types
  - Infos and Info types
- Program Functionality
  - Software Components
  - Data Flow
- Troubleshooting
  - Network Connectivity Troubleshooting
  - Console Log
  - Trace facility

6.2 SP7 Transmission Network Applications (TNA)

Objectives

Participants gain basic knowledge of the functions of Transmission Network Applications (TNA).

General Information

Course Code	GSW-U-SP7-TNA
Delivery Method	Classroom, Remote, On-Site
Duration	3 Days
Language	English or German

Target Audience

This course is designed for those responsible for maintaining and using Transmission Network Applications.

Roles: Network Engineers, Power System Engineers, Programmer/Analysts, Lead Dispatchers

Prerequisites

- Spectrum Power 7 Overview
- Basic RedHat Linux usage and comfort with the vi editor

Content

- TNA database structure and access
- TNA database generation and population
- TNA source code and executable directories
- For each Transmission Network Application
- Input data and output results
- User Interface
- Purpose and features
  - Important definitions
  - Problem formulation
  - Solution methods
  - Interfaces with other TNA and with the rest of the system

6.3 SP7 Transmission Network Applications (TNA) Support

Objectives

Participants gain knowledge to support the availability and quality of Transmission Applications results.

General Information

Course Code	GSW-U-SP7-TNAS
Delivery Method	Classroom, Remote, On-Site
Duration	3 Days
Language	English or German

Target Audience

This course is designed for those responsible for maintaining and ensuring the availability and quality of Transmission Network Applications results.

Roles: Operations Support Engineers, Power System Engineers, Lead Operators

Prerequisites

- Spectrum Power 7 Overview
- Familiarity with State Estimator, Dispatcher Power Flow and Contingency Analysis functionality and features

Content

- State Estimator and Power Flow problem formulation
- State Estimator tuning
- State Estimator trouble shooting
- Power Flow trouble shooting
- Contingency Analysis trouble shooting
  - Application parameter usage
- Useful logs for trouble shooting
- Display review

6.4 SP7 Power Applications (AGC)

Objectives

This course provides the participant with the information needed to maintain and enhance the Spectrum Power 7 Automatic Generation Control (AGC) Power Applications.

General Information

Course Code	GSW-U-SP7-AGC
Delivery Method	Classroom, Remote, On-Site
Duration	3 Days
Language	English or German

Target Audience

This course is designed for those responsible for maintaining and enhancing the Spectrum Power™ 7 Applications.
Roles: System Administrators, Software Engineers, Programmer/Analysts/DBA

Prerequisites

- Familiarity with Power System modeling concepts
- Familiarity with AGC theory
- Spectrum Power™ 7 Overview

Content

- 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

6.5 SP7 PowerScript – Extending Core Functionality

Objectives

PowerScript is a generalized scripting API that enables certain functionality to be added to the Baseline without the need of code changes. For example, scripts may be written to generate event messages under certain database conditions. Isolating this type of additional functionality in scripts reduces risk by isolating and reducing changes (which are always a risk to some degree) and supports upgradability (external scripts using pre-defined APIs tend to be more portable than specific Project Enhancements).

Participants gain basic knowledge of the functions of PowerScript and how to define simple scripts.

General Information

Course Code	GSW-U-SP7-PS
Delivery Method	Classroom, Remote, On-Site
Duration	2 Days
Language	English or German

Target Audience

This course is designed for those responsible for maintaining and enhancing the Spectrum Power™ 7 system, particularly in the SCADA (Alarm/Data processing) area.
Roles: System Administrators, Software Engineers, Programmer/Analysts/DBA

Prerequisites

- Spectrum Power 7 Overview
- Spectrum Power 7 Database Fundamentals - Introduction and Engineering
- Basic awareness or literacy of Python is recommended

Content

- Overview
- Getting Started
- Scripting
- Templates
- PowerScript Extensions
- Examples
- Scenarios

6.6 SP7 User Interface (UI) - Application Coding

Objectives

Participants gain basic knowledge of the functions of the how application UIs are defined and what can be customized by customers.

General Information

Course Code	GSW-U-SP7-UI
Delivery Method	Classroom, Remote, On-Site
Duration	3 Days
Language	English or German

Target Audience

This course is designed for those responsible for display building or who have an interest in display building in the Spectrum Power™ 7 system.
Roles: Display Builders, Programmers/Analysts, System Maintenance

Prerequisites

- Spectrum Power 7 Overview
- Spectrum Power 7 Database Fundamentals - Introduction and Engineering

Content

- UI Introduction
- Spectrum Displays
- UI General Architecture
- Application Data Servers
- Tabular Displays
- Modifying Application (WebSDK) Displays

7. Spectrum Power Workshops

7.1 SP7 Applications Data Engineering Workshop

Objectives

This course provides practical experience preparing and identifying data dependencies with the application data for an energy management system. The workshop will take place after the formal training and discuss the project's implementation of the skills learned.

General Information

Course Code	GSW-U-SP7-ADEW
Delivery Method	Classroom, Remote, On-Site
Duration	1-2 Days
Language	English or German

Target Audience

Data engineers whose responsibilities include the collection of data to be input into Spectrum Power 7, data input, data correction, data integrity, and coordination of data changes.

Prerequisites

- Spectrum Power 7 Overview
- Spectrum Power 7 Database & Data Model Fundamentals

Content

- Review topics covered in formal training
- Identify data requirements
- Prepare data for input
- Discuss protocols
- Compare project data with Spectrum Power 7 requirements
- Develop action plan

7.2 SP7 Display Generation Data Engineering Workshop

Objectives

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

General Information

Course Code	GSW-U-SP7-DGDEW
Delivery Method	Classroom, Remote, On-Site
Duration	1-2 Days
Language	English or German

Target Audience

Data engineers whose responsibilities include the collection of data to be input into Spectrum Power 7, data input, data correction, data integrity, and coordination of data changes.

Prerequisites

- Spectrum Power 7 Overview
- Spectrum Power 7 Database & Data Model Fundamentals
- Spectrum Power 7 Graphic Editor and Display Courses

Content

- Review topics covered in formal training
- Identify display requirements
- Prototype displays
- Discuss displays, elements, and attributes
- Compare project displays with Spectrum Power 7 requirements
- Develop action plan
- Define implementation schedule

7.3 SP7 Historian Data Engineering Workshop

Objectives

This workshop is an opportunity to discuss and decide on what kind of data—and how much of it (and at what periodicity)—can be stored into SP7's IS&R application (HIS) and what the system will be configured to hold (e.g., retention periods).

General Information

Course Code	GSW-U-SP7-HDEW
Delivery Method	Classroom, Remote, On-Site
Duration	1-2 Days
Language	English or German

Target Audience

Data engineers whose responsibilities include the collection of data to be input into Spectrum Power 7, data input, data correction, data integrity, and coordination of data changes.

Prerequisites

- Spectrum Power 7 Overview
- Spectrum Power 7 Historical Information System

Content

- Review topics covered in formal training
- Identify project's data to be archived
- Discuss techniques
- Identify reports to be archived
- Develop action plan
- Define implementation schedule

7.4 SP7 Operator Training Simulator Workshop

Objectives

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

General Information

Course Code	GSW-U-SP7-OTSW
Delivery Method	Classroom, Remote, On-Site
Duration	1-2 Days
Language	English or German

Target Audience

Data engineers whose responsibilities include the collection of OTS data to be input into Spectrum Power 7, data input, data correction, data integrity, and coordination of data changes.

Prerequisites

- Spectrum Power 7 Overview
- Spectrum Power 7 Database Fundamentals

Content

- Review topics covered in formal training
- Identify project's data to be archived
- Discuss techniques
- Identify reports to be archived
- Develop action plan
- Define implementation schedule

7.5 SP7 SCADA Data Workshop

Objectives

This workshop provides practical experience preparing and entering SCADA data for the energy management system. The exercises will incorporate actual project data.

General Information

Course Code	GSW-U-SP7-SDW
Delivery Method	Classroom, Remote, On-Site
Duration	1-2 Days
Language	English or German

Target Audience

Data engineers whose responsibilities include the collection of data to be input into Spectrum Power 7, data input, data correction, data integrity, and coordination of data changes.

Prerequisites

- Spectrum Power 7 Overview
- Spectrum Power 7 Database Fundamentals

Content

- Review topics covered in formal training
- Identify project's data to be archived
- Discuss techniques
- Identify reports to be archived
- Develop action plan
- Define implementation schedule

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