

COURSE DESCRIPTION

EcoStruxure Power Monitoring Expert (PME)

9.x Advanced Programming

Overview

This advanced programming course focuses on system and device level customization using the *Designer* interface in PME software. Students will learn the architecture of the ION meter along with using the *Designer* interface to examine the default frameworks. Students will be guided through a series of lab activities to creating custom applications for equipment monitoring, alarming and logging. Students will learn to program the *Virtual ION Processor (VIP)* for special applications such as data aggregation, logging, and alarming. Students will then have the opportunity to create a custom virtual meter framework by aggregating multiple meters in the VIP and displaying the real-time and historical information from that newly created meter in the Vista application. Students will learn the differences between the default meter templates and firmware versions that can be uploaded to devices and be able to describe each. At the end of the course, students will have created frameworks for integrating the several types of WAGES devices available and programmed frameworks that will perform process and control applications.

Duration

4 Days (M-W 8am-4pm / Th 8am-1:30pm). *Please book departing flights for 4pm or later on the last day of class.*

Who should attend

This course is designed for anyone who works with a PME system and has reasonable knowledge of the default functions of ION meters and PME software. This course may be appropriate for meter/instrumentation technicians, system engineers and system integrators who need to learn how to get the most out of their PME software and associated meters.

Prerequisites

- Working knowledge of PME software, especially experience using *Vista*
- Working knowledge of the default capabilities of ION meters
- General computer skills and basic working experience with Microsoft Windows
- Completion of a PME Fundamentals or Overview course is recommended

Students will be able to

- Describe ION architecture and ION module properties
- Examine configuration of meters installed in a PME system
- Understand the procedure to backup and restore a meter template
- Construct programs to perform custom calculations
- Describe how Designer and Vista work together
- Build programs for logging and alarming
- Construct programs for Advanced WAGES metering
- Build programs to read Modbus registers from one device to an ION meter
- Program applications inside of ION meters to monitor processes and control functions
- Understand the ION Reference document and how to use it
- Learn best practices for programming in Designer

Agenda

Day 1

Course Introduction

- Student and Instructor introductions and overview of course logistics
- Overview of course topics and agenda

Describe ION architecture and ION module properties

- Describe the ION module concept including setup and output registers
- Describe functions of core ION meter modules
- Use *ION Reference* and *PME System Guide* documents

Explore navigation inside of the PME Designer interface

- Use *Designer* to open a meter node
- Use *Designer* to view input and output registers
- Use *Designer* to explore notes made inside of templates
- Use *Designer* to make links to different modules

Backup and Restore ION meters

- Backup and restore a meter's Template using ION Setup
- Understand updating meter firmware
- Describe the different file types in Designer

- Backup Frameworks and config files in Designer

Construct Vista Screens that work with Designer Programs

- Use *Designer* and *Vista* to see how registers link together
- Use Designer to create programs that can be controlled in Vista
- Link to setup registers in Designer from Vista for control

Day 2

Create and understand the Counter Module

- Design a program that counts pulses being sent from Vista
- Display totalized values inside of Vista
- Discuss other uses for counter Modules

Understand the Clock and Periodic Timer Module

- Add a clock module to the system and view its outputs in Vista
- Create Periodic timers in designer
- Explore the different outputs from the modules
- Discuss possible applications for these modules

Utilize and understand the functionality of the Arithmetic Module

- Create a framework to perform basic math operations
- Modify the framework to understand advanced syntax in the Arithmetic module

Create a framework for recording data to the SQL database

- Observe how data flows through the PME system to the database
- Build frameworks for logging data in the system
- Display logged data in Vista
- Understand the Windows Services that are involved with data logging
- Display logged data in Vista

Day 3

Create custom alarms in Designer using the Set Point Module

- Program custom Alarms in PME using the Set point module
- Create alarms for values that fall outside of a band range

- Display Alarms in Vista using the Global Events view
- View alarms in the web client
- Add custom alarms in the system using the web client
- Discuss how to modify and customize alarming
- Discuss alarm management and best practices

Design and build your own Virtual Meter

- Apply programming "Best Practices" when building custom applications
- Build a program in the VIP that takes the input from multiple meters and creates a virtual meter
- Design a Vista page to display the output from this newly created virtual meter
- Expand the frameworks capability using modules and skills learned throughout the week to perform more advanced calculations
- Discuss possible applications for this newly created virtual meter

Understand the capabilities of Digital inputs and outputs

- Look at the installation guides to examine the specifications for wiring to an ION meter
- Use *Designer* to view input and output registers
- Build programs to calculate Min/Max/Average/Total values from a pulse input
- Use Logical Devices to assist with system names and measurements

Day 4

Use the meter to calculate production line energy usage

- Simulate production count through a digital input on a meter
- Program modules to calculate total energy per object and output values to the database
- Examine other uses for similar programs

Program a framework for load shedding

- Understand the inputs and outputs of the program
- Add functionality to override the automatic control of the framework
- Build Vista screens to test, troubleshoot, and validate programs functionality

Construct programs for Modbus Mastering

- Configure the serial parameters to communicate to downstream Modbus devices
- Use Designer to create a framework to read values from a downstream serial device
- Configure the meter to broadcast Modbus values from that device over the network
- Modbus Master an Ethernet connected Modbus device over the network to the ION meter

Build a program for high speed data recording

- Understand the modules required for high speed data logging
- Build Vista screens to interact and test program functionality
- Expand program to display a total time function has been enabled

Course Summary

- Answer any remaining questions
- Outline available resources for education going forward