ICE014

Practical SCADA & Telemetry Systems for Industry

Course Introduction:

Supervisory Control and Data Acquisition (SCADA) refers to the combination of telemetry and data acquisition. SCADA encompasses the collecting of the information, transferring it back to the central site, carrying out any necessary analysis and control and then displaying that information on a number of operator screens or displays. The required control actions are then conveyed back to the process.

This course is designed to provide SCADA and industrial networking personnel with a thorough grounding in the principles on which their operating environment is based, including discussion on developments in supporting technology. The course will appeal to people newly involved in the field, professionals in related disciplines and operations personnel and managers.

Course Objectives:

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

- ✓ Recognize the different components of a SCADA system
- ✓ Appreciate the basic principles of data communications
- ✓ Evaluate the requirements for PLC-to-SCADA communications
- ✓ Understand the importance of the ISO OSI model
- ✓ Appreciate the use of wireless communications in the industrial environment
- ✓ Recognize the various wireless communication standards
- ✓ Apply radio telecommunications in a practical manner and make use of troubleshooting techniques
- ✓ Understand the concept of Modbus/Serial and Modbus/TCP
- ✓ Apply Modbus in a practical manner and make use of troubleshooting techniques
- ✓ Understand modern SCADA applications and deployments

Who Should Attend?

This course is intended for all instrumentation and control engineers, process control engineers, electrical engineers, consulting engineers, design engineers, operations managers/engineers, maintenance engineers /supervisors, control system application engineers, project engineers, operations technicians, plant engineers and it personnel.

Course Outline:

Day 1:

PRE TEST

INTRODUCTION

- Fundamental principles of SCADA system
- Considerations and benefits of SCADA system
- SCADA hardware
- SCADA software
- SCADA and local area network

OVERVIEW OF SCADA SYSTEMS

- Hardware alternatives (RTU / PLC etc.)
- Communication architectures and philosophies
- Communication architectures
- Communication philosophies
- Polled (or master slave)
- CSMA/CD system (peer-to-peer)
- Communication alternatives

Day 2:

SCADA SYSTEM   HARDWARE

- Hardware components
- Introduction
- Comparison of the terms SCADA, DCS, PLC and smart instrument
- Remote terminal units
- Application programs
- PLCs used as RTUs
- The master station
- System reliability and availability
- Typical considerations in configuration of a master station
- Operation and selection issues

SCADA SYSTEM SOFTWARE

- Introduction
- The components of a SCADA system
- The SCADA software package
- Specialized SCADA protocols
- Error detection
- Distributed network protocol
- New technologies in SCADA systems

- SCADA software functions
- Response times
- Redundancy issues
- Specification and configuration issues
- The twelve golden rules

Day 3:
LOCAL AREA NETWORK SYSTEMS

- Introduction
- Network topologies
  - Bus topology
  - Bus topology advantages
  - Bus topology disadvantages
  - Star topology
  - Ring topology
- Media access methods
- IEEE 802.3 Ethernet
- MAC frame format
- High-speed Ethernet systems
- Fast Ethernet design considerations
- Network interconnection components
  - Repeaters
  - Bridges
  - Router
  - Gateways
  - Hubs
  - Switches
- SCADA and the Internet

COMMUNICATION PROTOCOLS

- RS-2321RS-4B5 interface standards
- MODBUS protocol
- DNP 3.0 protocol

INDUSTRIAL ETHERNET

- Fundamentals
- Redundancy

TCP/IP

- o The TCP/IP protocol structure
- o Routing in an Internet
- o Transmission control protocol (TCP)

- Configuration
- Troubleshooting utilities

Day 4:
MODBUS TCP

- Overview

OPEN PROCESS CONTROL (OPC)

- Overview

HUMAN MANAGEMENT INTERFAC (HMI)

- Ergonomic factors
- HMI organization
- HMI screen design

Day 5:
SCADA ALARM MANAGEMENT

- Alarm management requirements
- Alarm layout and organization
- Seven Steps to a Highly Effective Alarm System
- Alarm priorities
- Alarm processing and reporting

SCADA NETWORK SECURITY

- Security issues
- SCADA firewall configuration

SCADA HISTORIAN

- Archiving plant data
- Data access

POST TEST

Course Certificate:

International Center for Training & Development (**ICTD**) will award an internationally recognized certificate(s) for each delegate on completion of training.

Course Methodology:

A variety of methodologies will be used during the course that includes:

- (30%) Based on Case Studies
- (30%) Techniques
- (30%) Role Play
- (10%) Concepts
- Pre-test and Post-test
- Variety of Learning Methods
- Lectures
- Case Studies and Self Questionaires
- Group Work
- Discussion
- Presentation

Course Fees:

To be advised as per course location. This rate includes participant's manual, and-Outs, buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

Course Timings:

Daily Course Timings:

08:00 - 08:20	Morning Coffee / Tea
08:20 - 10:00	First Session
10:00 - 10:20	Coffee / Tea / Snacks
10:20 - 12:20	Second Session
12:20 - 13:30	Lunch Break & Prayer Break
13:30 - 15:00	Last Session