ICTD
المركز العالمي للتدريب والتطوير
International Centre For Training & Development

INDUSTRIAL
Communication and SCADA Systems

Course Description:

This course, Industrial Communication and ASCADA System is designed to provide engineers and technicians with the basic theoretical and practical understanding of SCADA systems together with an overview of modern digital communication standards and networks – starting at the basic RS232 standard right through to Modbus over TCP/IP and how this can be applied to optimize their systems in terms of safety, flexibility and costs. The workshop also discusses modern radio links, ranging from application through to troubleshooting, and the use and selection of wireless link devices.

Course Objectives:

On successful completion of this workshop 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?

Professionals involved in designing, installing, testing, operating and maintaining process instrumentation and control systems

- Automation Engineers
- Chemical Engineers
- Consulting Engineers
- Design Engineers
- Electrical Engineers
- Electricians
- Instrument and Process Control Engineers and Technicians
- Maintenance Engineers
- Mechanical Engineers and Technicians
- Operations Engineers
- Process Engineers

Course Outline:

Day1

Introduction to SCADA systems

- Overview
- Modern Instrumentation and Control Systems
- "Smart" Instrumentation

Basic communication principles

- Overview
- Transmission Modes
- Digital systems
- ASCII Code
- Description of UART
- Standards

Numbering systems

- Binary numbering
- Hexadecimal

SCADA systems

- Hardware and software architecture
- Functionality and alarm handling
- Marshalling terminals and RTUs
- Basic communication system
- Application development
- Engineering

Remote Terminal Units (RTUs)

- Introduction
- RTU environmental enclosures
- Control processor and memory (CPU)
- Digital processing

Day 2

Communications media

- Cabling
- Fibre optics

Serial Data Communications

- RS-232/485 Standards

ISO OSI model

Error detection

- Checksum

- CRC

HART Protocol

Modbus Protocol

Day 3

SCADA Instrumentation

- Overview
- Block Diagram
- Sensors
- Electronics
- Power considerations
- HMI
- Installation, Maintenance, Troubleshooting
- Transmitter
- SCADA channels: wired & wireless
- Examples

Day 4

SCADA System Architecture

- Control Room
- Supervisory control
- PLC
- DCS
- Fieldbus: Profibus, Foundation Fieldbus
- Sensors & Actuators
- Communication Links and channels
- HMI
- Alarms
- PLC – SCADA communications

Telemetry: Wireless Links

- Elements of a Radio Link
- The radio spectrum and frequency allocation
- IEEE Wireless standards
- Examples of devices
- Implementation
- Miscellaneous Considerations

Day5

Products

- Siemens WinCC and SIMATIC

Applications

- Chemical plant
- Oil & Gas
- Waste Water Treatment
- Boiler automation

Demonstrations

- Intelligent irrigation system
- Intelligent industrial security system

The Future

- Industrial Internet (II)
- SCADA and the Internet of Things (IoT)
- IP Protocol Version 6: Ipv6

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 Certificate:

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

Course Fees:

To be advised as per course locations. This rate includes participant's manual, Hand-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