



IE102: SCADA Programming, Maintenance & Troubleshooting

Training Description:

This course is designed to provide a thorough understanding of the fundamental concepts and the practical issues of SCADA systems. Particular emphasis has been placed on the practical aspects of SCADA systems with a view to the future. Formula and details that can be found in specialized manufacturer manuals have been purposely committed in favour of concepts and definitions.

It provides an introduction to the fundamental principles and terminology used in the field of SCADA. It is a summary of the main subjects to be covered throughout the course. SCADA (supervisory control and data acquisition) has been around as long as there have been control systems. The first 'SCADA' systems utilized data acquisition by means of panels of meters, lights and strip chart recorders. The operator manually operating various control knobs exercised supervisory control. These devices were and still are used to do supervisory control and data acquisition on plants, factories and power generating facilities.

The second part of this course covers the application of SCADA systems for the monitoring and control of manufacturing facilities within a single site. It also covers the additional elements that are common to all SCADA systems. These include Alarm Management, Human Management Interface (HMI), Network Security, SCADA Historians, Troubleshooting, Maintenance and Specification issues.

Training Objectives:

By the end of the training, participants will be able to:

- ✓ Develop their existing understanding of SCADA system
- ✓ Recognize the different components of a SCADA system
- ✓ Appreciate the basic principles of data communications
- ✓ Evaluate requirements for PLC-to-SCADA Communications and understand the importance of the ISO OSI Model
- ✓ Appreciate the use of wireless communications in the Industrial environment and recognize the various wireless communication standards.
- ✓ Apply radio telecommunications in a practical manner and make use of troubleshooting techniques
- ✓ Apply Modbus in a practical manner and make use of troubleshooting techniques
- ✓ Understand the construction, the arc extinguishing principles of Surface Production Facilities Operations
- ✓ Acquire the skills and practical knowledge to identify the requirements for SCADA system
- ✓ Develop their existing understanding of Surface Equipment Facilities Troubleshooting

Training Designed for:

This course is intended for Instrumentation & Process Controls Engineers and Highly Qualified Technicians. Also, those who have direct responsibility for or require a working knowledge of SCADA/PLCs will benefit from the most up-to-date developments in Modern Process Control.

Training Program:

DAY ONE:

- ❖ Pre-Test
- ❖ Introduction



❖ **Networking and Data Communication**

- Network Communication
- Network Structure
- Point-to-point Communication
- Broadcast 'Multiple Drop' Communication
- ISO OSI (Open System interconnection) Reference
- Local Area Network (LAN)
- LAN Characteristics & Topologies
- LAN's Components
- Transmission Media
 - Twisted Pair
 - Coaxial Cable
 - Optical Fiber Cable

❖ **Medium Access Control Techniques**

- CSMA (Carrier Sense Multiple Access)
- CSMA with Collision Detection (CSMA/CD)
- Token Bus
- Token Ring

DAY TWO:

❖ **Wide Area SCADA Systems**

- Hardware Alternatives (RTU/PLC)
- Communication Concentrators
- Communication Alternatives
- Communication Architectures
- Communication Philosophies

❖ **SCADA System Hardware/Software**

- Hardware Components
- Operation and Selection Issues
- SCADA Software Functions
- Response Times
- Redundancy Issues
- Specification and Configurations Issues

DAY THREE:

❖ **Communication Protocols**

- RS-232/RS-485 interface Standards
- MODBUS Protocol
- DNP 3.0 Protocol

❖ **Communication for SCADA Systems**

- Serial Communication
 - Alternatives
 - Dimensioning Issues
 - Configuration

- LAN/WAN Communication
 - Alternatives
 - Dimensioning Issues
 - Configuration

DAY FOUR:

- ❖ **Process Plant SCADA Systems**
 - Hardware Alternatives (DCS/PLC/Fieldbus)
 - Communication Alternatives
 - Fieldbus / Profibus
 - Foundation Fieldbus
 - Adjusting Pressure
- ❖ **SCADA Configuration**
 - TCP/IP
 - Modbus TCP
 - Open process Control (OPC)
 - SCADA Installation & Commissioning

DAY FIVE:

- ❖ **SCADA Network**
 - Alarm Layout and Organization
 - Alarm Priorities
 - Alarm processing and Reporting
 - Human Management Interface (HMI)
 - SCADA Network Security
 - SCADA Historian
 - Archiving Plant Data
- ❖ **SCADA Maintenance & Troubleshooting**
 - Maintenance Activities
 - Problem Isolation
 - Testing Methodology
 - Noise Issues
 - Communication Testing
- ❖ **Course Conclusion**
- ❖ **Post-Test and Evaluation**

Training Requirements:

“Hands-on practical sessions, equipment and software will be applied during the course if required and as per the client’s request.”

Please note that the above topics can be amended as per client’s learning needs and objectives. Further, it should be forwarded to us a month prior to the course dates.



Training Methodology:

This interactive training course includes the following training methodologies as a percentage of the total tuition hours:

- 30% Lectures, Concepts, Role Play
- 70% Workshops & Work Presentations, Techniques, Based on Case Studies & Practical Exercises, Software & General Discussions
- Pre and Post Test

Training Certificate(s):

Internationally recognized certificate(s) will be issued to each participant who completed the course.

Training Fees:

As per the course location - This rate includes participant's manual, hand-outs, buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

Note: The 5% VAT (Value Added Tax), will be effective starting 01st of January 2018 as per the new regulation from the UAE Government. The VAT applies for all quotation both for local and abroad.

Training Timings:

Daily Timings:

07:45 - 08:00	Morning Coffee / Tea
08:00 - 10:00	First Session
10:00 - 10:20	Recess (Coffee/Tea/Snacks)
10:20 - 12:20	Second Session
12:20 - 13:30	Recess (Prayer Break & Lunch)
13:30 - 15:00	Last Session

For training registrations or in-house enquiries, please contact:

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Training & Career Development Department