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IE070:
Practical SCADA & Telemetry Systems for Industry

Training Description:

Supervisory Control and Data Acquisition (SCADA) technology has evolved over the past 30 years as a method of monitoring and controlling large processes. SCADA refers to the combination of telemetry and data acquisition.

SCADA encompasses the collecting of the information via a RTU (Remote Terminal Unit), 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.

SCADA systems consist of three functional components: communications equipment, Remote Terminal Units (RTUs), and Master Terminal Units (MTUs). Communications is the spine of SCADA technology. All information from remote sites must successfully negotiate the communications system to get from the RTU to the MTU.

The course offers overviews of SCADA Siemens component technologies, as well as details necessary to understand the big picture. SCADA processes cover areas that may be measured in the thousands of square miles, and have dimensions that may be hundreds, occasionally thousands, of mile long. Now a mature technology, SCADA includes, but is not limited to, software packages that can be incorporated in a larger system. After completing this course, participants should be conversant with SCADA Siemens nomenclature and architecture, understand the basic technology of the system's building blocks, understand its limitations, understand how it can benefit particular operations, and have a basis for selecting appropriate SCADA Siemens technologies for their operational requirements.

This intensive training course is designed to introduce the participants to the basics of SCADA Siemens by providing overviews of relevant topics where possible and details where necessary. Since SCADA Siemens consists of the elements of several different technologies, it is sometimes difficult to know where to stop when describing some of these technologies to the participants. The course attempts to focus on such technologies to the extent that they make SCADA Siemens more understandable. The course also identifies major differences between the SCADA systems of different industries. Because the basics of SCADA are much the same from one industry to another, however, examples from many industries have been included throughout the course.

The course will cover most popular PLC's used in the industry, such as Quantum, Allen Bradley, Siemens, Bristol, Emersons, Omron and Telemechanique Shneider Modicon with extended case studies for Allen Bradley and Siemens.

Training Objectives:

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

- ✓ Apply and gain a comprehensive knowledge on SCADA and telemetry systems for industry
- ✓ Define and identify SCADA including applicable process, elements of a SCADA system, limited two-way system, development from telemetry and dependence on communications and computers
- ✓ Identify real time systems, remote control, communications and radio
- ✓ Differentiate between remote terminal units (RTUs) and master terminal units (MTUs)
- ✓ Illustrate sensors, actuators and wiring as well as applications and operator interface

- ✓ Determine SCADA economics including costs versus benefits, time value of money, capital costs, training and maintenance costs, SCADA operating costs, etc.

Training Designed for:

This course provides a wide understanding and deeper appreciation of SCADA and telemetry systems for industry for those who wish to learn the basics of SCADA systems. It is intended to be useful to managers, supervisors, engineers and other technical staff who contemplate coming in contact with SCADA systems.

Training Program:

DAY ONE:

- ❖ Pre-Test
- ❖ Introduction
- ❖ What is SCADA?
  - Definition of SCADA
  - Applicable Processes
  - Element sofa SCADA System
  - A Limited Two-way System
  - Development from Telemetry
  - Dependence on Communications and Computers
- ❖ Real-Time Systems
  - What Really is Real Time?
  - Communications Access and "Master-Slave"
  - Determining Scan Interval
  - Where to Compute?
- ❖ Remote Control–What Not to SCADA
  - Murphy's Law and Remote Control
  - Safety Instrumented Systems
  - Regulatory Requirements
- ❖ Communications
  - Communications Makes SCADA Possible
  - Data is Binary: Analog-to-Digital Conversion
  - Long Distance Communications is Serial
  - Communications System Components
  - Protocol
  - Modems
  - Synchronous or Asynchronous?
  - Telephone Cable or Radio?

DAY TWO:

- ❖ Radio
  - Simplex or Duplex?
  - Turn-On Time
  - Frequencies: Are they Available?
  - Path Studies and Seasonal Variations

- Solar Variations
- Reliability and Maintenance
- Satellite Communications
- CellPhones

❖ Remote Terminal Units (RTUs)

- What does an RTU Do?
- Communications Interface
- Protocol Detailed
- Discrete Control
- Analog Control
- Pulse Control
- Serial Control
- Monitor Discrete Signals
- Monitor Analog Signals
- Monitor Pulse Count Signals
- Monitor Serial Signals
- Non-RTU Functions

DAY THREE:

❖ Master Terminal Units (MTUs)

- Communications Interface
- Configuring a Picture of the Process
- Some Simple Applications
- Data Storage

❖ Sensors, Actuators and Wiring

- A Forgotten Cost
- Special Considerations
- Standardization
- Maintenance

DAY FOUR:

❖ Applications

- Real Time Revisited
- Accounting and Grade of Data
- Scanning and Communications
- Some Automatic Control
- Advisory Applications

❖ Operator Interface

- Local Security Considerations
- System Security Considerations
- Alarming
- Control Change Screens
- Status Screens
- Graphics and Trending
- Reports

- Parallel Operator Interface

❖ Simulator (Hands-on Practical Sessions)

- Practical sessions will be organized during the course for participants to practice the theory learnt. Participants will be provided with an opportunity to carryout various exercises using one of our state-of-the-art simulators "Allen Bradley SLC 500", "AB Micrologix 1000 (Digital or Analog)", "AB SLC5/03", "AB WS5610 PLC", "Siemens S71200", Siemens S7-400" "Siemens SIMATIC S7-300", "Siemens S7-200" "GE Fanuc Series 90-30 PLC", "Siemens SIMATIC Step 7 Professional Software" and "HMI SCADA"

DAY FIVE:

❖ SCADA Economics

- Costs versus Benefits
- The Time Value of Money
- Capital Costs Training and Maintenance Costs
- SCADA Operating Costs
- Benefits: Reduced Capital Costs
- Benefits: Reduced Process Operating Costs
- Benefits: Improved Facility Effectiveness
- Tax Implications

❖ What's Next?

- Better Communications
- Smarter RTUs
- Smarter MTUs
- Local Area Networks (LANs)
- External Applications
- Spread-Spectrum Radio for SCADA

❖ Course Conclusion

❖ Post-Test and Evaluation

Training Requirement:

"**Hand's on practical sessions, equipment** and **software** will be applied during the course if required and as per the client's request".

Practical sessions will be organized during the course for participants to practice the theory learnt. Participants will be provided with an opportunity to carryout various exercises using one of our state-of-the-art simulators "Allen Bradley SLC 500", "AB Micrologix 1000 (Digital or Analog)", "AB SLC5/03", "AB WS5610 PLC", "Siemens S71200", Siemens S7-400" "Siemens SIMATIC S7-300", "Siemens S7-200" "GE Fanuc Series 90-30 PLC", "Siemens SIMATIC Step 7 Professional Software", and "HMI SCADA".

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 Certificate(s):

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

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 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