

**Training Title**

**O&M PROJECT MANAGEMENT AND SCADA SYSTEM**

**Training Duration**

5 days

**Training Venue and Dates**

O&M Project Management and SCADA system	5	29 Jan-02 Feb, 2022	\$5,500	Dubai, UAE
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*Trainings will be conducted in any of the 5 star hotels.*

**Training Fees**

- *5,500 US\$ per participant for Public Training includes Materials/Handouts, tea/coffee breaks, refreshments & Buffet Lunch.*

**Training Certificate**

*Prolific Consultants FZE Certificate of Course Completion will be issued to all attendees.*

**COURSE OVERVIEW**

**COURSE INTRODUCTION**

*This course provides an in-depth introduction to O&M management and Supervisory Control and Data Acquisition (SCADA) systems. Participants will learn how remote sensing and actuation are combined with modern communication techniques to effectively monitor and control very large industrial processes, like oil fields, pipelines, and electrical power systems. This course will cover most major SCADA applications, SCADA system components and architecture.*

*A selection of real-world case studies is used to illustrate the key concepts with examples of real-world working SCADA systems in the water, electrical and processing industries and this workshop will be an excellent opportunity to network with your peers as well as gain significant new information and techniques for your next SCADA project.*

*Although the emphasis of the course will be on practical industry topics highlighting recent developments using case studies and the latest application of SCADA technologies the fundamentals of SCADA systems will be covered. The course is aimed at those who want to be updated on the latest developments in SCADA systems and want to get a solid appreciation of the fundamentals of SCADA and Telemetry design, installation and troubleshooting.*

## **COURSE OBJECTIVE**

- *Understand how SCADA developed from its source technologies*
- *Recognize the factors that make SCADA different from other process control systems*
- *Apply several different architectures common to SCADA systems*
- *Determine which process control parameters may or may not be controlled by SCADA*
- *Analyze the main building blocks and determine how they are integrated into a SCADA system*
- *Apply protocol rules used to enable machines to communicate with other machines*
- *Select protocols based on field-imposed parameters*
- *Calculate scan times for various sized systems*
- *Differentiate the strengths and shortcomings of various communications media used by SCADA systems*
- *Describe the advantages and disadvantages of standards for data interoperability*
- *Understand how SCADA is used in Oil and Gas production*
- *Understand how SCADA is used for Electric generation, transmission and distribution*
- *Understand how SCADA is used in Irrigation and Municipal Water treatment*
- *Describe drivers for future applications.*

## **TRAINING METHODOLOGY:**

*A highly interactive combination of lectures and discussion sessions will be managed to maximize the amount and quality of information and knowledge transfer. The sessions will start by raising the most relevant questions, and motivate everybody find the right answers. You will also be encouraged to raise your own questions and to share in the development of the right answers using your own analysis and experiences. Tests of multiple-choice type will be made available on daily basis to examine the effectiveness of delivering the course. Very useful Course Materials will be given.*

## **SUITABLE FOR:**

- **Instrumentation and Control Engineers & Technicians**
- **Electrical Engineers**
- **Projects Engineers**
- **Design Engineers**
- **Control System Sales Engineers**
- **Maintenance Supervisors**
- **Control System application engineers**

## **COURSE OUTLINE**

### **1. Basic Concept of SCADA**

*Definition of terms*

- *Analog - Discrete - Digital*

- *Accumulator - Also, Totalizer*
- *RTU -- Remote Terminal Unit*
- *MTU - Master Terminal Unit*
- *Bit - Byte - Word - Parity*
- *Abbreviations*

*History of SCADA*

*Non-Critical Control & Monitoring*

*Monitoring Concepts*

*Accumulation Concept*

*Simple Control Actions*

*SCADA Application*

*SCADA Architecture; Simple & Complex*

## **2. Remote Terminal Units (RTUs)**

*RTUs: Location, architecture, hardware, dumb or smart*

*RTU Communication*

- *What does RTU do to talk to MTU?*
- *The Medium for SCADA Messaging*
- *RTU/MTU Communication*
- *RTU Communication to Sensors & Actuators*
- *Machine-Machine Communication*

*RTU - Monitoring & Control*

*RTU Power Supplies*

- *UPS for the RTU*
- *Several Layers of UPS*

## **3. Field Devices**

*Input Sensors:*

- *Discrete input Sensors*
- *Discrete Input Signal Conditioning*
- *Analog input Sensors*
- *Analog Input Signal Conditioning*
- *Pulse Input sensors*
- *Pulse Input Signal Conditioning*
- *Serial Sensors*

*Field Actuators*

- *Pushing and Pulling*
- *Twisting and Turning*

*Field Devices - Environmental*

- *Hazardous Areas*
- *Methods to Avoid Explosions*

#### **4. Master Terminal Unit**

*MTU Hardware*

*MTU Communication*

*MTU Communication Capability*

- *Master Slave Example*
- *More Complex Example*
- *Master Slave with Store & Forward*
- *Peer to Peer Communication*
- *Polled Report by Exception*

*MTU Functionality*

- *MTUs Communicate with RTUs*
- *Machine Machine Communication*

*Communication Topology*

- *Supervisory Control*
- *MTU Function - Scan Periods*
- *Factors that Affect Scan Rate*

*Communication Overhead*

- *MTUs Communicate with Operator*
- *MTUs Store Programs*
- *MTUs Store Gathered Information*
- *MTUs Run Application Programs*

*Alarm Handling*

- *Alarm Handling - Priority Levels*
- *Start Up Alarm Masking*
- *Dynamic Alarm Masking*
- *Report Generation*

#### **5. SCADA Communications**

*Importance to Concepts of SCADA*

*Importance to SCADA Architecture*

*Concepts of Communication*

- *Wire Media*
- *Other Media*

*Communication Standards*

- *IEEE - 802: Local Area Network*
- *IEEE 802 Topologies*

*Basic SCADA Communications Concepts*

- *Communication Handshaking*
- *Protocol Layout*

- *What Is Not a Protocol?*
- *Protocol Development*
- *Protocol – General Layout*
- *Message Establishment*
- *Information or Data*
- *Termination*
- *Error Detection*
- *Modbus*
- *Other Popular Protocols*

#### **6. Data Interoperability**

- *OPC Background*
- *OPC Data Exchange*
- *OPC Benefits*
- *OPC Basics*
- *OPC DA*
- *OPC HDA*

#### **SQL**

- *Relational Databases*
- *SQL Example*
- *SQL Example - DDL to create new tables*
- *SQL Example - DML to retrieve data*
- *Versions of SQL*
- *SQL Compatibility Issues*

#### **7. Traditional SCADA Applications**

##### *SCADA Applications – by Industry*

- *Oil Production*
- *Gas Production*
- *Generation, Transmission, and Distribution*
- *Pipeline Applications of SCADA*
- *Water Pipeline*
- *Gas Pipeline*
- *Oil Pipeline Applications*
- *Irrigation*
- *Municipal Water Departments*

**Videos, Relevant Case Studies, Group Discussions, Last Day Review, Pre& Post Assessments will be carried out.**

**P r o l i f i c**  
C O N S U L T A N T S F Z E

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