



ICE006

Troubleshooting of Data Acquisition & SCADA Systems

Course Introduction:

This course covers all aspects of data acquisition and control using a PC and data loggers, including design, specification, programming, installation and configuration. The popular IEEE 488 interface is also covered in detail.

The course gives both the novice and experienced user a solid grasp of the principles and practical implementation of interfacing the PC and standalone instruments to real world signals. Upon completion of the workshop you will have a thorough understanding of PC based data acquisition systems and will be able to design, specify, install, configure and program data acquisition systems quickly and effectively. An additional aim of the workshop is to cover the industrial communications standards that are used with instruments today.

Course Objectives:

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

- ✓ How to install and configure a data acquisition system
- ✓ Why over 30% of data acquisition systems give incorrect results
- ✓ How to choose and configure the correct software
- ✓ State of the art approaches in design of data acquisition systems
- ✓ How to configure data communications systems
- ✓ How to avoid the common pitfalls in designing a data acquisition system

Who Should Attend?

This course is intended for all design engineers, electrical engineers, electronic engineers, instrumentation and control system engineers, process control engineers, project engineers, systems engineers and technicians.

Course Outline:

Day 1:

PRE TEST

INTRODUCTION

- Data acquisition and control
- Fundamental principles of data acquisition and control systems
- Typical PC based applications

ANALOG AND DIGITAL SIGNALS

- Sensors, transducers and temperature transducers
- Strain gauges
- The difference between single ended and differential systems
- Earthing and isolation techniques to reduce noise
- Cable shielding and earthing

Day 2:

SIGNAL CONDITIONING

- The different types of signal conditioners
- Signal conditioning functions and signal filtering
- Isolation and overvoltage protection

THE PC FOR REAL TIME WORK

- The different data transfer methods
- Streaming of data to hard disk

Day 3:

PLUG IN DATA ACQUISITION BOARDS

- Typical analogue to digital (A/D) boards
- Single ended vs differential signals
- Analogue to digital (A/D) board specifications
- Capturing high speed transient data
- Principles of data sampling
- Speed vs throughput of data
- Typical digital to analogue (D/A) boards
- Input / Output (I/O) boards
- Counter/timer I/O boards
- Practical considerations with use of digital I/O boards

RS-232/RS-485 SERIAL DATA COMMUNICATIONS STANDARDS

- RS-232 hardware interface
- Principles of RS-232 handshaking
- RS-485 hardware interface
- Communication protocols (e.g. Modbus)
- Error detection
- Troubleshooting serial data communications systems

Day 4:

CONTROLLERS AND DATA LOGGERS

- Hardware structure of standalone devices
- Practical applications of data loggers
- How to improve communication bottlenecks

IEEE-488 SYSTEMS

- IEEE-488.1/IEEE-488.2 and SCPI specifications
- Hardware configuration
- Device types (controllers/listeners/talkers)
- Basic communications
- Advanced communications

Day 5:

INDUSTRIAL ETHERNET AND TCP/IP

- Configuring an Ethernet system
- Troubleshooting TCP/IP and Ethernet
- Connecting Ethernet based instruments and data loggers to a PC
- Tips and tricks with Ethernet

UNIVERSAL SERIAL BUS (USB)

- Concept and practice
- USB explained
- Benefits for data acquisition and communications

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 Questionnaires
- 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.

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International Centre For Training & Development

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