The Independent Solution Provider for Industrial and Process Automation, Quality & IT

Industrial Ethernet Training Course – Fundamentals and Best Practice

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Industrial Ethernet Training Course Target Group

This course is intended for controls engineers who are required to design and specify **ethernet networks** in an **industrial environment**. It is largely conducted as a presentation.

HSR - **Industrial Ethernet** ring networks with seamless redundancy

Industrial Ethernet Training Course (Pre) Knowledge

No specific prior knowledge is required, though a familiarity with common industrial automation and control equipment such as PLCs, PCs, and electro-technology in general, is assumed.

Industrial Ethernet Training Course Content

Networks are now a strategic asset of manufacturing, facilitating large amounts of data transfer quickly and reliably. They need however to be properly understood so that good design decisions are made to support the needs of the business.

In this course, participants will gain an understanding of the fundamentals of **Ethernet** based TCP/IP networks. This will include concepts such as the 7 layer OSI model, and address commonly asked questions such as difference between a hub, a switch and a router, a managed and unmanaged switch, unicast, broadcast and multicast, and what makes **Ethernet 'industrial'**? Having established the foundations, the course addresses best practice designs in terms of topology & resiliency, bandwidth requirements, multicast management, VLANs and Quality of Service.

Industrial Ethernet Training Course Methods

ATS courses are given by highly qualified trainers, with practical knowledge, in professional ATS training centres or On-Site. Prior to the course an intake conversation can take place to define the participant(s) and the company's requirements. Presentations (theory and examples) as well as practical exercises bring the courses to life. ATS courses are interactive, the trainer will always make sure the **Industrial Ethernettraining course** contents link back to your situation.

Industrial Ethernet Training Course – Specific Curriculum

Topics

The objective of this **Industrial Ethernet training course** is to understand the fundamentals of **ethernet based networks** in an **industrial environment**, and to know the design issues requiring consideration.

Lesson 1
- History of **Ethernet**
- 7 Layer OSI model
- Common questions:
  - Hubs v Switches, Switches v Routers, Managed v Unmanaged
  - Half-Duplex v Full Duplex
- Fundamentals:
  - Media, Connectors & Transceivers – Copper / Fibre / WLAN

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- ○ MAC, IP addressing
- ○ Collision Domain
- ○ Unicast / Broadcast / Multicast
- ○ Learned Address Table, Port Aging
- Switch Ports & Configuration - Autonegotiation/auto-crossing/auto-polarity, data rate.
- **'Industrial' Ethernet**
- DHCP

Lesson 2
- Common Switch Functions:
  - ○ VLAN, Quality of Service.
- Common Protocols:
  - ○ SNMP, DHCP, IGMP Query & Snooping, Agregation
- Industrial Protocols
  - ○ EtherNet/IP, Modbus TCP, Profinet
- Layer 3 Concepts & Routing
- Redundancy topologies and protocols
- Design Principles
  - ○ Resiliency, Segregation, Bandwidth, Security, Downtime minimisation