Industrial Communications Training

Optimizing the flow and value of real-time data

Setting the Standard for Automation™

Expert-led training with real-world application from a global leader of automation and control resources

Communication networks are the mission-critical backbone of automation and control solutions. And, given the rapid changes occurring in the area of communications, comprehensive industrial communications training is essential to address ever-evolving technical challenges.

After all, improperly designed, programmed, or maintained communications networks and components can lead to unreliable performance, loss of critical data, security breaches, and system downtime and failure.

As a widely recognized, world leader in automation and control training, the International Society of Automation (ISA) provides the proven expertise needed to protect your industrial communications systems, and the practical methodologies to help you immediately apply your knowledge in the workplace.

ISA's industrial communications training starts with the fundamentals, providing the underlying principles and tools needed to design effective communications systems, and outlining the equipment, software, and protocols required to transmit, report, and process real-time data. More advanced instruction covers programming, installation, maintenance, and integration of programmable logic controllers (PLC) and programmable automation controllers (PAC), and furnishes critical survival strategies for instrumentation and control personnel.

All ISA training courses provide real-life examples and case histories, further reinforcing the practical and relevant nature of ISA training. To ensure flexibility and to meet varying customer needs, ISA offers communications training at a variety of locations: at ISA headquarters in North Carolina, at ISA's many regional training centers, and onsite directly at customer facilities.

Who is ISA?

Founded in 1945, ISA is a global organization that serves automation and control professionals through standards development, certification, education, training, publishing, and technical conferences and events. To learn more about ISA Training, visit www.isa.org.

ISA Training: World-class subject-matter expertise

ISA's courses are known and respected worldwide for their unbiased, practical approach to technology application. For more than 65 years, ISA has built on its proven track record of identifying and providing real-world technical resources for automation and control professionals. ISA works with leading content experts to deliver rapid, customized solutions.

Taking an ISA training course will:

• Enhance on-the-job training
• Fill in missing knowledge gaps
• Teach you the How's and Why's
• Provide continuing education credits
• Expand your professional network
• Give you access to industry experts

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IT Survival Basics for I&C Personnel (TS04)

This course will provide I&C personnel with a basic understanding of IT concepts and technology including Ethernet networking, switches, routers, servers, PCs and firewalls, as well as wireless Ethernet networks and TCP/IP communications. The student will learn how to configure them and how cyber security is applied to protect them. Upon completion of this course, individuals will have a familiarity with basic IT concepts and technology which will enable them to effectively collaborate and communicate with IT personnel and perform basic IT functions essential in a modern plant and with modern control systems technology.

YOU WILL BE ABLE TO:
- Configure a switch for VLANs, Quality of Service
- Explain typical basic settings found in modern switches
- Configure a basic firewall rule set for plant applications
- Select the appropriate settings for 'hardening' a PC
- Configure the security settings for Wireless Ethernet
- Configure IP and Ethernet addresses and subnet masks
- Perform a security scan of a computer
- Configure a fault-tolerant switched LAN

YOU WILL COVER:
- Ethernet communications
- Ethernet switch technology and configuration
- Setting up VLAN and QoS configurations
- ARP and DHCP protocols that make Ethernet LANs work
- IPv4 addressing and subnet configuration
- TCP and UDP port numbers
- TCP and UDP protocols and message delivery
- Ethernet-based Industrial Protocol standards
- Insecure legacy Microsoft networking functions
- Microsoft Active Directory in a plant environment
- Firewalls and how they can be applied in a plant environment
- Controlling communications with routers in a plant environment
- Vulnerability scanning and tools
- IEEE 802.11 WLANs and wireless security configuration
- Defense-in-depth architectures
- Network intrusion detection technology for the plant
- Secure use of portable devices and media
- Hardening of PCs and servers
- Virtual computers, servers and networks
- Patching, updating and maintaining security
- Remote access to plant systems

CLASSROOM/LABORATORY EXERCISES:
- Using Wireshark to "sniff" and analyze Ethernet traffic
- Configuring a DHCP server
- Configure IP addresses and subnet masks on PCs
- Configuring a VLAN using switches
- Configuring a fault-tolerant Ethernet ring
- Setting up a wireless router with security
- Configuring a network monitor
- Hardening a Windows PC configuration
- Using a vulnerability scanner
- Using Virtualization technology

RECOMMENDED PREREQUISITES:
- General familiarity with Windows OS
- Basic DC electrical circuit knowledge

COURSE DETAILS:
Course No.: TS04
Length: 5 Days
CEUs: 3.5
Price: $3,080 ISA Member
        $3,465 Affiliate Member
        $3,855 Community Subscriber/List
        $3,080 Group

Part of ISA's System Wide Awareness Training (S.W.A.T.) Learn more at: **www.isa.org/swatcourses**

2018 SCHEDULE
Newark, DE .... 9–13 July
Houston, TX. .... 10–14 September

Industrial Data Communications Systems (TS06)

Starting from the basics, this course gives you the tools to design and maintain industrial communications systems on your plant floor. You'll learn the underlying principles behind today's industrial communications systems, including Modbus, Data Highway Plus, Ethernet, and TCP/IP. Real-life examples and case histories provide insight into the facts behind control networks and how to effectively apply and maintain them in your plant.

YOU WILL BE ABLE TO:
- Apply serial standards, such as EIA-232, 422, 423, and 485, in plant floor settings
- Compare media access techniques such as CSMA/CD, token passing, and master/slave
- List options for Ethernet hardware to avoid instant obsolescence and being locked in the past
- Select and apply fiber optic technology
- Differentiate between different wireless and Industrial Ethernet alternatives
- And more...

YOU WILL COVER:
- What is Data Communications?
- Serial Communications
- Industrial Protocols
- LAN Technologies
- Fiber Optics
- And more...

CLASSROOM/LABORATORY EXERCISES:
- Solve EIA-232 cabling problems
- Use protocol analyzers to capture serial and network traffic
- Use oscilloscopes to analyze network signals
- Use cable analyzers to diagnose cable/fiber optic problems
- And more...

COURSE DETAILS:
Course No.: TS06
Length: 5 days
CEUs: 3.5
Price: $3,080 ISA Member
$3,465 Affiliate Member
$3,855 Community Subscriber/List
$3,080 Group

RECOMMENDED RESOURCE:
ISA Text: *Industrial Data Communications, Fourth Edition* by Lawrence M. Thompson

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2018 SCHEDULE
Newhall, CA (Los Angeles Metro) .... 12–16 February
RTP, NC .... 14–18 May
Newark, DE ....16–20 July
Houston, TX. .... 17–21 September

Industrial Networking & Security (TS12)

This course will cover the latest developments in networking, including practical tips on designing, implementing and testing TCP/IP-based networks and how to apply them securely and reliably in an Industrial environment. The elements used to create and protect an industrial network including switches, routers, firewalls and Intrusion detection/prevention systems are also discussed, as well as practical knowledge of LAN, WAN, and Web technologies. It illustrates what is safe and practical for today's plant floor, including Internet technologies such as web servers, TCP/IP, and fiber optics. Special focus will be placed on the questions of security in the industrial setting drawing on the work of the SP-99 committee and NIST. It covers the details of IP addressing and how functions and protocols such as DHCP, DNS, ARP/RARP and fast spanning tree are essential to make such networks function, including network troubleshooting and the use of network diagnostic tools.

YOU WILL BE ABLE TO:
- Identify analog dial-up connections and modems standards
- Apply the TCP/IP protocols, addressing, and troubleshooting
- Estimate where web technologies can safely be used for process control
- Understand security technologies such as firewalls, proxy servers, virus scanning, and intrusion protection
- Perform basic security scanning on your networks and perform 'hardening' of your computers
- And more…

YOU WILL COVER:
- TCP/IP Networking
- Secure Architectures
- Understanding Packets and Protocols
- Building a Plant Floor Web Server
- Network Security Issues
- And More

CLASSROOM/LABORATORY EXERCISES:
- Configuring basic network parameters and settings
- Use TCP/IP diagnostic tools in Windows-2000/XP
- Using network analyzers to troubleshoot
- Use web technology to display plant data
- Configure a security firewall for the plant floor
- Perform a basic security scan on a target system

COURSE DETAILS:
Course No.: TS12
Length: 5 Days
CEUs: 3.5
Price: $3,080 ISA Member
          $3,465 Affiliate Member
          $3,855 Community Subscriber/List
          $3,080 Group

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2018 SCHEDULE

Newhall, CA (Los Angeles Metro) .... 19–23 February
RTP, NC .... 21–25 May
Newark, DE ....23–27 July
Houston, TX. ....24–28 September

PLC Fundamentals for the Technical Professional (TC40)

NEW!

This course will focus on the role the programmable logic controller plays in the design of a control system and how proper selection, installation and maintenance can reduce operating costs and improve performance. It will provide the technical expertise necessary to install, perform routine programming and maintenance and apply proper troubleshooting and configuration techniques.

YOU WILL BE ABLE TO:
- Define terminology, software/hardware, and demonstrate the concept of configuration
- Determine the necessary calculations and conversions using the binary, decimal, octal, and hexadecimal number systems
- Apply correct programming, editing, and documentation procedures
- Implement ladder logic instructions including: XIC, XIO, OTE, OSR, OTL, OTU, TON, TOF, RTO, RES, CTU, CTD, MOV, and COP
- Demonstrate the use of BCD and the seven-segment display, data manipulation, math, force function, multipoint, and online editing
- And more…

YOU WILL COVER:
- Number systems - codes - logic gates
- Configuration - Structure
- Examine On - Examine Off
- Output Terminal Energize - Output Terminal Latch - Unlatch
- One Shot Rising - Processor Modes of Operation
- On/Off-Delay Timer - Retentive Timer
- Reset - Counters
- Binary Coded Decimal
- Seven-Segment Display
- Program Creating and Editing
- Documentation – Report Creation and Output
- Data Manipulation - Force Function
- Math – Logical and Comparison Instructions
- Analog Current - Voltage modules
- Thermocouple - Millivolt modules
- Resistance Temperature Device – Resistance Modules
- PLC Networks
- Variable Speed Motors

CLASSROOM/LABORATORY EXERCISES:
- Hardware Identification
- RSLogix500 Software
- RSLogix500 Help
- Configuring a Communication Driver
- Creating a New Project
- And more…

COURSE DETAILS:
Course No.: TC40
Length: 5 Days
CEUs: 3.5

2018 SCHEDULE
Course archived for open enrollment. Only available for in-plant offering.