



Course Outline – Shop Floor Networking

Course Topic: Shop Floor Networking

Recommended Contact Hours: 30 hrs.

Course Description:

Shop Floor Networking will explore the various types of communication systems used in industrial systems for the transportation and exchange of data. Network topologies and specifications, LAN and field bus technologies, used in manufacturing are presented. The data exchange techniques and formats between typical industrial equipment for information and control will be described. Configuration requirements examples of the industrial devices are presented to show the use in manufacturing applications.

Course Outcomes and Objectives

Objectives

SFN-1 Summarize the essential characteristics of industrial communications for an automated system

1. List typical device used in industrial networks and their control/data functions
2. Describe the topologies used in industrial networks
3. Describe the use of zones for data throughput and control for industrial networks
4. Explain Virtual Local Area Networks (VLAN) and their use in industrial networks
5. IN-2 Describe and list the characteristics of Ethernet Communication
6. Describe the architecture of an Ethernet network

SFN -2 Describe and list the characteristics of Ethernet Communications

1. Describe the architecture of an Ethernet network
2. List the core TCP/IP protocols
3. Explain data packets and transmissions methods
4. Explain the protocols as defined by the common protocols associated with the TCP/IP internetwork layer
5. Explain the Transport layer protocols
6. Describe static and Dynamic Host Configuration Protocol (DHCP) addressing
7. Define the differences between network hubs and switches
8. Explain Routing protocols
9. Explain wireless IP communications





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SFN -3 Classify the devices and usage of Serial Communications

1. Describe the architecture of an industrial serial network
2. Explain point-to-point and multicast serial communications protocols
3. Configure devices for serial communications
4. Install and configure an Ethernet Communications Module. Interpret diagnostic indicators status related to the modules functionality
5. Perform the replacement procedure of the following modules:
 - DeviceNet Communications module
 - DeviceNet Input Node
 - DeviceNet Output Node
6. Install and configure a ProfiNet Communications Module. Interpret diagnostic indicators status related to the modules functionality

SFN -4 Classify the devices and usage of ProfiNet and Ethernet/IP communications

1. Describe the architecture of an industrial Ethernet network
2. List the specifications for industrial Ethernet communications
3. Explain the requirements for the installation of industrial Ethernet communications
4. Explain the use of unmanaged and managed switches for industrial Ethernet communications
5. Describe the purpose and use of ring redundancy for industrial Ethernet communications
6. Configure devices for industrial Ethernet communications

SFN -5 Classify the devices and usage of ProfiBus and DeviceNet Communications

1. Describe the architecture of an industrial field bus network
2. Explain the requirements for the installation of industrial field bus communications
3. Describe the communication modes for field bus networks
4. Configure devices for industrial field bus communications

SFN -6 Identify and list the data usage of field devices in industrial networks

1. List and describe the use of data for programmable controllers
2. List and describe the use of data for HMIs and operator interface devices
3. List and describe the use of data for robots
4. List and describe the use of data for machine tools
5. List and describe the use of data for other devices, such as, inspection, part readers, and tooling





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