NTT Training

HANDS-ON INDUSTRIAL TRAINING CATALOG

With NTT you get America's best hands-on industrial training. We have the industry's largest team of master instructors. Only NTT offers you full-sized hands-on lab equipment for the widest variety of courses, ensuring that you actually *learn by doing*. Skills you'll use on the job right away.

Welcome

Thank you for spending some time with NTT. I trust that the time you've invested with us provides you a meaningful, practical, hands on training experience that you'll be able to use on the job tomorrow.

With over 1 million people trained so far, we've listened to you, and we've built our courses around you. Your feedback helps to guide our teaching methods and the training tools we've crafted for you.

If our courses could help further your career, then call us toll-free to register at **1-800-922-2820**, or visit our website, **www.nttinc.com**.

Thank you, and please send me your thoughts and ideas to help our ongoing effort to improve your learning experience. You can reach me directly at **dan@nttinc.com** anytime.

Warm regards,

Dan Rinn
President
National Technology Transfer, Inc.

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NTT Training

We're Hands-On

Partner with NTT to manage your training and compliance programs

NTT helps America maintain a highly safe and proficient skilled workforce. For nearly three decades, NTT has successfully trained nearly 1,000,000 employees at thousands of companies and government agencies around the world. Each of our master instructors brings an average of 30 years of real-world experience into the classroom. Plus, only NTT has full-sized equipment for the widest variety of courses to ensure that students actually *learn by doing*.

NTT is the only provider that integrates instructor-led classroom training, e-learning, managed learning services, electrical qualification training and consulting to develop company-specific safety programs. Our comprehensive and holistic approach to training, safety and compliance reduces workplace accidents and increases productivity.

On-site training

We conduct one to five-day instructor-led courses on over 60 subjects within our program disciplines: Electrical Safety, Electrical Systems, National Electrical Code, Compliance, HVAC, Fluid Power and Mechanical Systems.

We can bring any of our training courses on-site to any of your locations – on your schedule – for your production challenges. Training at your location reduces employee downtime and training costs. It eliminates travel expenses and allows employees to remain on-site to cover work shifts. Clients typically save up to 25% per participant.

The most valuable benefit is that we can customize courses and learning materials for your company's specific needs to ensure training meets business objectives, is relevant to your personnel and is designed for your operating environment.

Why leave the building? Train at your location

- Anywhere. Anytime. Any way. We can bring any of our 60+ training courses on-site to any of your locations – on your schedule – customized to focus on your company's production challenges.
- Reduce employee downtime and training costs: On-site training eliminates travel expenses and allows employees to remain on-site to cover operations. Save up to 25% per participant by bringing our course to your site.
- Eliminate hassles and stay within budget: We handle all logistics of instructor travel as well as shipping equipment and textbooks. All expenses are included in your cost so you won't be surprised with unexpected bills.
- Customize your training: We can customize course content and learning materials for your company's needs to ensure the training is specific to your facilities, equipment, personnel and business objectives.
- Hands-on Labs: We can bring full-sized mobile hands-on lab equipment to your location to ensure that each student learns on real-world equipment. We can also train your employees on your equipment.

Hands-on training saves lives

Would you let a surgeon operate on your heart if you discovered he'd only learned how to perform surgery by watching videos? We wouldn't! Additionally, OSHA requires "classroom or on-the-job type" training for qualified electrical workers. When it comes to performing hazardous procedures, hands-on training can mean the difference between life and death. Hands-on labs teach students *real* skills - on *real* equipment - for *real-world* situations.

NTT Regional Courses

Remember that our regional courses are available for individuals or one-off classes.

For nearly three decades, NTT has successfully trained nearly 1,000,000 employees, many of which have attended our public courses scheduled in cities nationwide each year. We continually expand our curriculum of two to five-day instructor-led courses within our seven program disciplines: Electrical Safety, National Electrical Code®, Electrical and Electronics, Compliance, HVAC, Fluid Power and Mechanical Systems. We deliver the best lecture and hands-on training because we have the industry's largest team of master instructors. We're also the only provider that offers full-size hands-on lab equipment for each of your students to ensure they learn by doing, which is essential for skilled trades.

Skill Circuit™ Online

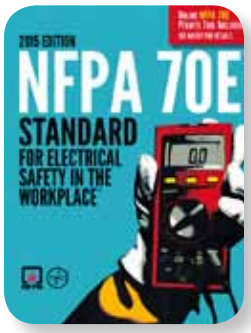
Our web-based learning management system delivers a comprehensive blended learning solution that ensures workers will retain more knowledge from their lecture style training. This program also helps companies manage training activities.

NTT Professional Services

We do more than training. How can we help you?

We consult with client management teams to develop company-specific training, workplace safety and workforce development programs. Our subject matter experts will collaborate closely with your team to develop a project scope and estimate based on requirements specific to your facilities personnel, equipment and training objectives. Not only do we consult, we help you implement highly sophisticated programs.

2015 NFPA 70E / Arc Flash Electrical Safety



Available in Spanish

NFPA 70E/Arc Flash Electrical Safety course meets the safety training requirements for employees bound by OSHA rule 29 CFR 1910:331-335. Learn how current NFPA 70E standards apply to a facility, why safe electrical work practices are important, and what can be done to ensure your organization meets all government standards for electrical safety. OSHA's mandated training requirements apply to employees who face a risk of electric shock that is not reduced to a safe level by the electrical installation requirements of OSHA 29 CFR 1910.303-308.

Electrical safety training empowers workers to perform their jobs safely. According to the US Department of Labor, electrocution is one of the main causes of on-the-job deaths of industrial workers. Within this group, skilled trades personnel—electricians in particular—are two times more likely to be seriously injured or killed than non-skilled trades personnel. Electrical safety training is a requirement even for technically competent electrical workers.

Agenda Topics:

- NFPA 70E 2015 Updates
- Safety Concepts
- Hazards of electricity
- Boundaries
- Selection and use of safe work practices
- Risk category tables
- Selection, use and care of personal protective equipment

Introduction to Arc Flash Analysis

This training is for anyone who works on or near exposed energized components operating at 50 volts up to 600 volts nominal. Additional training may be required in regards to specific work methods and recognition of hazards associated with specific equipment and work methods. Additional training may also be required for voltages above 600 volts nominal.

Agenda Topics:

- Calculate fault current and incident energy levels using various methods, including scientific calculators using the IEEE formulas, Excel® spread sheets, and over the counter software
- Proper PPE relative to the task to be done
- Job hazard analysis.
- Create a "living" document for new tasks and used as a reference to accomplish a task that has already been analyzed
- Warning labels energized work permit equipment safety
- System grounding

Related Courses

Implementing 2015 NPFA 70E

In this course we will consider implementing the 70E/Z462 directives, why workers perform as they do and what an employer might consider when discovering then evolving their facility safety culture.

Go to page 7 for more details.

2012 NFPA 79: Electrical Standards for Industrial Machinery

Get an overview of scope of the NPFA 79. Learn how to effectively use the Standard as a guideline for wiring, sizing conductors and overcurrent protection for industrial machines operating from a nominal voltage of 600 volts or less.

Go to page 9 for more details.

2014 NEC®

The National Electrical Code® is used by all states for industry-wide electrical standards. Ensure your organization is in compliance. This course benefits individuals who are either at an introductory level or who are experienced in working with electrical systems. Significantly increase their knowledge, skill level and confidence.

Go to page 12 for more details.

Electrical Safety Practical Skills

Review current OSHA standards that apply to your facility and the effects of the 2015 NFPA 70E standards on your high voltage areas. Keep yourself and your environment safe with proper personal protective clothing during grounding and switching of electrical equipment. Learn the electrical hazards in switch gear rooms, as well as safe switching procedures and documentation of electrical equipment.

Agenda Topics:

- Training requirements for employees working on high voltage systems and equipment
- OSHA 1910.269 and 1910.331-335
- Electrical hazards in switch gear rooms
- Minimum approach for over 600 volts
- Safe electrical work practices for high voltage systems and equipment
- Safe switching procedures and documentation of electrical equipment
- Applying the two-person rule
- Proper personal protective equipment for switching and clearance duties
- Selecting and using test equipment to ensure absence of voltage
- How to inspect and test protective equipment
- Proper sizing, inspecting and installing of grounding clusters
- Care and proper body positioning when handling live line tools, including hot sticks

Implementing 2015 NFPA 70E

When implementing NFPA 70E and CSA Z462 an employer must understand that these documents are addressing work behaviors. Until the deeper issue of the safety DNA of the worker and the safety culture of a facility are understood then an employer is only marking time until an incident may occur. Human nature is such that people learn to perform as expected when they are being observed. The greater question is, "What will they do when working alone, feeling pressured or in an emergency?" What in my company's culture leads them to determine which path to choose?

In this course we will consider implementing the 70E/Z462 directives, why workers perform as they do and what an employer might consider when discovering then evolving their facility safety culture.

Agenda Topics:

- NFPA 70E — Road map to electrical safety
- Developing safe electrical workers (Qualified Workforce)
- Conducting an arc flash hazard analysis
- Developing electrical safe work practices (ESWP)
- Auditing and monitoring work practice compliance

Related Courses

Substation Maintenance for Supervisors and Managers

Learn what every supervisor and manager needs to know about managing the electrical safety of employees. Review why maintenance is critical to power systems and how to determine proper maintenance intervals.
Go to page 10 for more details.

2014 NEC®

The National Electrical Code® is used by all states for industry-wide electrical standards. Ensure your organization is in compliance. This course benefits individuals who are either at an introductory level or who are experienced in working with electrical systems significantly increase their knowledge, skill level and confidence.
Go to page 12 for more details.

Electrical Qualification Training

Resolve a compliance quandary: How to produce qualified electrical workers. What process needs to be established in order for companies to deem them as "qualified" with defensible evidence of compliance?
Go to page 11 for more details.

Electrical Systems in Hazardous Locations

Identify hazardous zones, learn codes, standards and certification requirements. The National Electrical Code® (NEC) defines hazardous locations as those areas where fire or explosion hazards may exist due to flammable gases or vapors, flammable liquids, combustible dust, or ignitable fibers or flyings. Articles 500 through 504, and 510 through 517 provide classification and installation standards for the use of electrical equipment in the three classified hazardous locations: type, condition and nature. Also learn about design issues, proper grounding and bonding, safe wiring methods and maintenance techniques.

Agenda Topics:

WHAT IS A CLASSIFIED LOCATION

- Classification of area locations—Class I, II, III
- Division and zone systems
- Groups within class, division, and zone

RULES

- National Electrical Code and other related articles

HAZARDOUS TRIANGLE

- Air, fuel and ignition sources

GROUNDING AND BONDING

- Hazardous area
- Adjacent areas

CLASSIFICATION OF SPECIFIC PROCESSES AND SPECIFIC OCCUPANCIES

- Classify any area
- Normal and abnormal conditions

COMPARISON OF DIFFERENT AREAS AND THEIR CLASSIFICATIONS

- Classification of area locations—Class I, II, III
- Multiple classifications

1910.269 - Electrical Safety for Power Generation, Transmission & Distribution

This course is essential for anyone working near energized stations. You will gain an advanced understanding of the safety standards that ensure a safe work environment that is in compliance with government standards.

Agenda Topics:

- OSHA 1910.269
- Job briefing requirements
- Develop and apply proper switching techniques
- Equipotential grounding and its application on the job
- OSHA clearance procedure requirements
- OSHA requirements for workers having access to or working on electrical utility systems
- Working on or near exposed lines
- Underground electrical installations
- De-energizing lines and equipment
- Substation safety
- Emergency procedures

Related Courses

Industrial Electricity: Basics and Troubleshooting

Gain a basic understanding of electricity generation and delivery. Learn how electricity is applied to transformers, motors and common electrical devices; how and where these components work and their applications.
Go to page 13 for more details.

Standby and On-Site Power Generation

Gain the background needed to operate, maintain and test the various types of generator sets used in on-site power production. As the need for reliable electrical power continues to increase many firms are turning to the use of on-site generators.
Go to page 15 for more details.

Maintaining Building and Facility Electrical Systems

Learn to design, modify and maintain building and facility electrical systems. See how various building electrical components work and how systems are designed. Learn how to size conduit and wire for power and lighting loads in accordance with NEC® standards.
Go to page 14 for more details.

NFPA 70B / Recommended Practices for Electrical Equipment Maintenance

Receive an overview of the necessary tools to construct a cost-effective preventive maintenance program for electrical systems and equipment that are in industrial, institutional and commercial buildings. Learn the techniques to help guard against premature damage from power surges, spikes, transients and every day usage. A well maintained system will lessen the chance of electrical failures.

Agenda Topics:

- Properly administered electrical preventive maintenance (EPM)
- Benefits of EPM
- Mechanics of EPM
- Dependability and support
- Planning and developing an EPM program
- EPM from commissioning through acceptance testing
- Fundamentals of electrical equipment maintenance
- Molded-case circuit-breaker power panels
- Equipment maintenance between shutdowns
- Uninterruptible power-supply (UPS)
- Protective device maintenance and arc flash hazard

NFPA 79: Electrical Standard for Industrial Machinery

Get an overview of scope of the NPFA 79 and understand its relationship with other codes. Learn how to effectively use the Standard as a guideline for wiring, sizing conductors and overcurrent protection for industrial machines operating from a nominal voltage of 600 volts or less.

Learn preventative maintenance for equipment and systems, and electrical, electronic and communication equipment.

Gain essential safety techniques and knowledge from protecting yourself and the equipment from electrical hazards to grounding and more.

Agenda Topics:

- Introduction to NFPA 79
- History of electric machine tools
- Modern machine tool electrical equipment
- Administration
- Referenced publications
- Definitions
- General operating conditions
- Incoming supply circuit conductor
- Terminations and devices for disconnecting and removing power
- Protection from electrical hazards
- Protection of equipment
- Grounding
- Control circuits and control functions
- Operator interface and control devices
- Control equipment location, mounting and enclosures
- Conductors, cable and flexible cords
- Wiring practices

Related Courses

2014 NEC®

The National Electrical Code® is used by all states for industry-wide electrical standards. Ensure your organization is in compliance. This course benefits individuals who are either at an introductory level or who are experienced in working with electrical systems significantly increase their knowledge, skill level and confidence.
Go to page 12 for more details.

1910.269 - Electric Safety for Power Generation, Transmission & Distribution

This is essential for anyone working near energized stations. You will gain an advanced understanding of the safety standards that ensure a safe work environment that is in compliance with government standards. *Go to page 8 for more details.*

Electrical Safety Practical Skills

Review current OSHA standards that apply to your facility and the effects of the NFPA 70E standards on your high voltage areas. Learn the electrical hazards in switch gear rooms, as well as safe switching procedures and documentation of electrical equipment.
Go to page 7 for more details.

Substations: Safety, Operation and Maintenance

Learn the best practices for electrical equipment safety testing. This intensive training program covers air-magnetic and vacuum circuit breakers found in most facilities from 2.3kV through 15kV.

Maintenance and testing (including interpreting test results) for circuit breakers, switchgear, battery and ground systems are covered in detail.

Develop the skills you need to manage the maintenance of substations. Power transformers and various types of protective relays are covered. Power factor testing, winding resistance, core excitation and FRA tests are just a few of the tests covered. Overcurrent, over/undervoltage and differential protective relays are covered, including how to inspect, maintain and calibrate.

Agenda Topics:

- Applicable regulations and standards
- Common equipment
- Safety
- Operation
- Maintenance
- Transformer and maintenance/testing

Substation Maintenance for Supervisors and Managers

Learn what every supervisor and manager needs to know about managing the electrical safety of employees. Review why maintenance is critical to power systems and how to determine proper maintenance intervals. Gain the knowledge about managing the electrical safety of employees.

The maintenance and testing required for common substation devices, including transformers, protective relays, circuit breakers, (air, vacuum, oil and SF6), grounding systems, batteries and chargers are all covered in detail. This intensive training program provides the latest information on maintaining and testing electrical power system equipment, including what to do, when to do it and interpreting test results.

Agenda Topics:

- Lubricant target cleanliness levels
- Step-by-step procedures for risk-free flushing
- Three types of filters that you need to get rid of now
- Tips for filtering problematic, high-viscosity lubricants
- Seven simple techniques for getting longer filter life and reducing filtration costs

Related Courses

Load Banking

Learn the electrical safety requirements, purposes and procedures for load banking generators and power systems. Technicians often work alone at remote locations and must select and use personal protective equipment (PPE) and safe work practices on their own.
Go to page 15 for more details.

2015 NFPA 70E/Arc Flash Electrical Safety

Learn how current 2015 NFPA 70E standards apply to a facility, why safe electrical work practices are important, and what can be done to ensure your organization meets all government standards for electrical safety.
Go to page 6 for more details.

1910.269 - Electric Safety for Power Generation, Transmission & Distribution

This is essential for anyone working near energized stations. You will gain an advanced understanding of the safety standards that ensure a safe work environment that is in compliance with government standards. *Go to page 8 for more details.*

Heartsaver® First Aid with CPR and AED and Emergency Response in an Electrical Emergency

This is a great addition to any electrical safety course. Review what voltage and arcs can do to the human body.

Learn what first response items should be within an arm's reach at all times and the importance of training for the worst while planning for it never to happen. Know the steps to take when someone is actively being shocked and what to do after the shock.

Electrical Qualification Training

Resolve a compliance quandary: How to produce qualified electrical workers.

Employers must demonstrate that any worker performing an electrical task is "qualified" for that particular task. It's up to the employer to figure out the best way to do this, and the task of "qualifying" electrical workers seems vague and nebulous: After proper hands-on training has been provided, what is the best way to demonstrate that workers can safely perform the electrical tasks that they are assigned? What process needs to be established in order for companies to deem them as "qualified" with defensible evidence of compliance?

Skill Circuit™ Electrical Qualification Training is a simple five-step program at your location that delivers a powerful blend of instructor-led classes and hands-on labs that enable workers to develop their skills using real equipment. The classroom training is reinforced with online assessments, courses and tutoring tools. But this program far exceeds training alone – it helps companies implement a documented and compliant process for producing qualified electrical workers that exceeds OSHA requirements and NFPA 70E standards.

Program Benefits:

- A reduction in workplace accidents, violations and fines.
- Increased business productivity due to properly trained workers that operate safely and know how to protect expensive equipment from damage.
- Training that exceeds OSHA mandates and NFPA 70E standards by providing a documented and compliant process for electrical training and worker qualification.
- A better training system that is standardized across multiple locations and yet is also customized for the company's facilities, equipment and operating environment.
- Improved worker morale and retention because workers appreciate the company's investment in their skills – and in their safety.

Related Courses

Electrical Safety Practical Skills

Review current OSHA standards that apply to your facility and the effects of the NFPA 70E standards on your high voltage areas. Learn the electrical hazards in switch gear rooms, as well as safe switching procedures and documentation of electrical equipment.
Go to page 7 for more details.

2015 NFPA 70E/Arc Flash Electrical Safety

Learn how current 2015 NFPA 70E standards apply to a facility, why safe electrical work practices are important, and what can be done to ensure your organization meets all government standards for electrical safety.
Go to page 6 for more details.

Fiber Optic Network Installation and Maintenance

Maintain your fiber optic network and learn the skills to minimize network downtime. Learn the ins and outs of design considerations and specification requirements.
Go to page 19 for more details.

2014 National Electrical Code®

The National Electrical Code® is used by all states for industry-wide electrical standards. Ensure your organization is in compliance now so you can avoid reworking your electrical systems.

This course benefits individuals who are either at an introductory level or who are experienced in working with electrical systems. By the conclusion of the course, both levels will significantly increase their knowledge, skill level and confidence.

The full five-day combination course will also address how to remain safe when working on or around electrical systems. Additionally, you will learn how to maintain electrical systems with the correct grounding and bonding techniques.

Agenda Topics:

- Applying the NEC – Article 90
- NEC 2014 Code Changes
- Electrical installation – Article 110
- Branch circuits and feeders – Article 110
- Services – Article 230
- Conductors and overcurrent protection – Article 240
- Wiring methods – Article 300
- Wiring material—raceway and boxes – Article 300
- Panelboards – Article 408
- Equipment for general use – Article 400
- Motors, generators, A/C and refrigeration and fire pumps – Articles 430, 440 and 695
- Transformers – Article 450
- Special locations – Articles 500 and 600
- Understanding the rules for overcurrent protection
- Industrial control panels (Article 409)

Grounding and Bonding

Establish strong grounding and bonding fundamentals and performance requirements essential for electrical installation, design and inspection while maintaining the highest level of electrical safety for persons and property.

Learn about grounding requirements as they relate to Article 250 and other articles of the National Electrical Code®. Installation, testing and inspection procedures for industrial, commercial, institutional and residential power systems are covered along with rules to minimize the risk of electricity as a source of electric shock, and as an ignition source of fires and explosions.

Agenda Topics:

- Fundamentals of grounding and bonding
- When to ground
- Grounding electrical systems and services
- Service equipment and man bonding jumpers
- Grounding electrodes and electrode systems
- Grounding electrode conductors
- Bonding enclosures and equipment
- Equipment grounding conductors
- Enclosure and equipment grounding
- Clearing ground faults and short circuits
- Grounding separately derived systems
- Ground-fault circuit-interrupter protection
- Ground-fault protection for equipment
- Grounding and bonding for special locations
- Grounding at (feeder supplied) separate structures
- Low-voltage and intersystem grounding and bonding
- Power quality systems

Related Courses

Introduction to Arc Flash Analysis

This training is for anyone who works on or near exposed energized components operating at 50 volts up to 600 volts nominal. Additional training may be required in regards to specific work methods and recognition of hazards associated with specific equipment and work methods.
Go to page 6 for more details.

Introduction to Instrumentation and Process Control

Understand instrumentation and process control to become more valuable as your skill set expands. Learn to program, connect input/output devices and to troubleshoot process controls.
Go to page 19 for more details.

Standby and On-Site Power Generation

Gain the background needed to operate, maintain and test the various types of generator sets used in on-site power production. As the need for reliable electrical power continues to increase many firms are turning to the use of on-site generators.
Go to page 15 for more details.

Industrial Electricity: Basics and Troubleshooting

Gain a basic understanding of electricity generation and delivery. Learn how electricity is applied to transformers, motors and common electrical devices; how and where these components work and their applications. You will also learn and practice safe methods and how to choose the proper instruments and tools to measure and comprehend the characteristics and properties of electrical signals in terms of voltage, current and impedance (resistance).

Gain invaluable experience in using and understanding electricity and its function in an electrical circuit. The course covers all aspects of electricity, including Ohm's law, terminology, common circuits, test equipment, safety, generators, motors and relays. Theory and explanations support numerous practical hands-on exercises, and can apply to real world situations.

Agenda Topics:

- Basic electricity
- Basics of multimeters
- Electrical safety guidelines
- Common and industrial wiring devices
- Lighting and heating
- Conductors and raceways
- Wires
- Electricians' tools and test equipment
- Generators and transformers
- Sold-state devices
- Protective devices
- Electrical drawings and symbols
- Motors

Troubleshooting Electrical Control Circuits

This is a basic course, without any prerequisites, that helps you develop a solid foundation on which to build your troubleshooting knowledge and skills. You will learn techniques that will help locate faults quickly. It starts with the fundamentals and builds from that point. About 70% of the time is spent working hands-on at a troubleshooting station with motor control circuits (operating at a safe, low level of 24 volts).

Learn basic troubleshooting techniques in a logical sequence to cover all the standard control circuits. Gain practical, useful techniques that can be put into immediate use.

Agenda Topics:

- Electrical Schematics
- Mapping Control Circuits: Ladder Diagrams
- Logical Circuits
- Basic Electrical Principles
- Transformers
- Disconnecting Devices and Symbology
- Automatic Switches
- Control Elements, Switches and Symbology
- Manual Switches: Functionality and Symbology
- Troubleshooting Suggestions and Safety Awareness
- Supplementary contact symbols and terms
- Ground-fault overload protection
- Motor overload protection
- Application specific circuits
- Safety awareness

Related Courses

Substations: Safety, Operation and Maintenance

Learn the best practices for electrical equipment safety testing. This hands-on intensive training program covers air-magnetic and vacuum circuit breakers found in most facilities from 2.3kV through 15kV.
Go to page 10 for more details.

Heartsaver First Aid with CPR and AED and Emergency Response in an Electrical Emergency

This is a great addition to any electrical safety course. Review what voltage and arcs can do to the human body.
Go to page 11 for more details.

Variable Frequency Drives

Learn proper design to ensure that your equipment is as energy efficient and safe as possible. Discover the best practices for frequency drives in HVAC, pumping and facility applications. Approximately 50% of these systems are running in bypass which usually results in higher energy costs.
Go to page 20 for more details.

Electrical Print Reading from Construction to Control

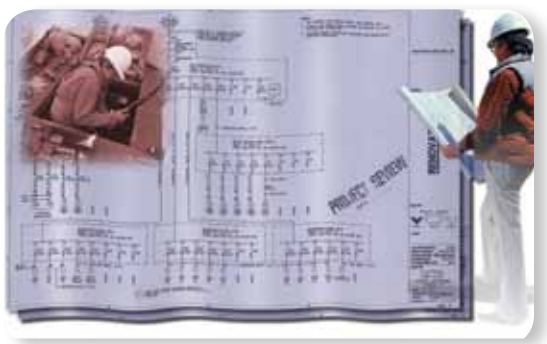
The course covers the various types and purposes of electrical prints, and teaches the skills needed to interpret them properly.

Review photos of electrical devices and equipment and their ANSI symbols and ratings. Examine diagrams and schedules in a typical construction project. Then review prints for errors and National Electrical Code® (NEC) compliance in voltage drop, conductor sizing, conductor fill, short-circuit analysis, kVA ratings, service calculations and more.

Learn to design and sketch simple electrical systems and circuits.

Agenda Topics:

- Introduction to reading and interpreting prints
- Architectural electrical drawings construction blueprints
- Single-line type diagrams
- IEEE and IEC symbols for devices found on schematic diagrams



Building and Facility Electrical Systems

Learn to design, modify and maintain building and facility electrical systems. See how various building electrical components work and how systems are designed. Learn how to size conduit and wire for power and lighting loads in accordance with NEC® standards.

- Fundamentals of building and facility electrical systems
- Types of industrial control systems
- Ratings and specifications
- Interior building distribution
- Transformers: below 600 volts
- Switchboards and switchgear
- Distribution centers
- Motor control centers and controls
- Panelboards and load centers
- NEMA enclosures
- Automatic transfer switches for generator systems
- UPS systems: uninterruptible power
- Fire alarm systems
- Design considerations
- National Electrical Code® voltage classifications, ampacity rules and calculations, articles, tables and figures

Related Courses

1910.269 - Electric Safety for Power Generation, Transmission & Distribution

This is essential for anyone working near energized stations. You will gain an advanced understanding of the safety standards that ensure a safe work environment that is in compliance with government standards. *Go to page 8 for more details.*

2014 NEC®

The National Electrical Code® is used by all states for industry-wide electrical standards. Ensure your organization is in compliance. This course benefits individuals who are either at an introductory level or who are experienced in working with electrical systems significantly increase their knowledge, skill level and confidence.
Go to page 12 for more details.

NFPA 70B/ Recommended Practices for Electrical Equipment Maintenance

Learn to construct a cost-effective preventive maintenance program for electrical systems and equipment that are in industrial, institutional and commercial buildings.
Go to page 9 for more details.

Load Banking

Learn about the electrical safety requirements, purposes and procedures for load banking generators and power systems. It is understood that many of these technicians often work alone at remote locations and must select and use personal protective equipment (PPE) and safe work practices on their own. These technicians are responsible for their own safety, as well as the safety of other persons while conducting the load bank testing. Technicians must understand the types of load banks, purposes of this testing, what to measure, procedures to safely conduct these tests and how to measure and interpret results.

Agenda Topics:

- Overview of load bank testing
- Review of recent electrical safety statistics, injuries and fatalities when working on power equipment
- Recognition of potential electrical hazards associated with standby power
- Field maintenance requirements for electrical safety
- Apply the safety requirements when working on standby power
- Walk-throughs and hands-on of load banking on customer equipment

Standby and On-site Power Generation

Gain the background needed to operate, maintain and test the various types of generator sets used in on-site power production. Common examples of facilities that heavily rely upon these systems include: data centers, hospitals, banks, airports, water treatment facilities, manufacturing and industrial plants, schools, sports stadiums and, commercial office buildings. As the need for reliable electrical power continues to increase many firms are turning to the use of on-site generators.

The generators discussed in this class range in size from small portable generators used only in temporary situations to larger standby power systems and, on to cogeneration units that operate tied onto the utility grid. The training begins with the basics of generators and prime movers and moves through typical generator and engine control systems and operations. Recommended maintenance and testing activities are also covered. Practical applications of operations and maintenance are heavily reinforced throughout the class.

Agenda Topics:

- Standby and on-site power generation overview
- Prime movers
- Generator set applications
- Electrical generation principles
- AC generator control, operation and protection
- Generator loading
- Troubleshooting and maintenance of on-site power generation systems

Related Courses

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Go to page 12 for more details.

Electrical Print Reading from Construction to Control

The course covers the various types and purposes of electrical prints, and teaches the skills needed to interpret them properly.
Go to page 14 for more details.

Introduction to Arc Flash Analysis

This training is for anyone who works on or near exposed energized components operating at 50 volts up to 600 volts nominal. Additional training may be required in regards to specific work methods and recognition of hazards associated with specific equipment and work methods.
Go to page 6 for more details.

Fundamentals of Programmable Logic Controllers

Focus on the fundamentals of PLCs from setting up communications to uploading and downloading programs to troubleshooting and modifying the system.

Spend most of the class time on various PLCs working on hands-on exercises. Working in small groups, learn to program, connect input/output devices and solve elementary and complex problems.

Program a PLC to provide real-time, interactive, diagnostics that pinpoints the issues. Use other troubleshooting methods such as the search function, cross references, histograms and forces.

Agenda Topics:

- History
- PLC Architecture
- Input and output (I/O) systems
- Ladder logic versus relay logic
- Relay-type instructions
- Addressing, data memory and scan time
- Additional instructions and associated bits
- Number systems
- Sizing and selection of PLCs
- Troubleshooting and diagnostics

Programmable Logic Controllers Automation Systems

Learn how operator interfaces (OIs), or human machine interfaces (HMIs) integrate with a PLC to access information about the machine. You will discover that the HMI is a well designed real-time troubleshooting tool when properly programmed.

Agenda Topics:

- Modern systems overview
- Hardware components
- Ladder logic review
- Human machine (operated) interfaces (HMIS) overview
- Motion control
- PID and analog control
- Remote I/O networks overview
- Diagnosing networks

Related Courses

Introduction to Instrumentation and Process Control

Understand instrumentation and process control to become more valuable as your skill set expands. Learn to program, connect input/output devices and to troubleshoot process controls including sensors, transmitters, controllers and final elements.
Go to page 19 for more details.

Tuning DDC/Process Control Loops

Optimize your process with proper setting and tuning of DDC or control loops to increase quality consistency. Learn the process characteristics that become the basis for tuning the DDC or process controller.
Go to page 20 for more details.

NFPA 79: Electrical Standards for Industrial Machinery

Get an overview of scope of the NPFA 79. Learn how to effectively use the Standard as a guideline for wiring, sizing conductors and overcurrent protection for industrial machines operating from a nominal voltage of 600 volts or less.
Go to page 9 for more details.

ControlLogix Maintenance and Troubleshooting

Gain a solid understanding of hardware, software and communication concepts inherent to Allen-Bradley's ControlLogix PLCs and Rockwell Software's RSLogix5000 ladder logic programming software. This course is designed for technicians, maintenance personnel or engineers who want to improve maintenance and troubleshooting skills in order to minimize machine downtime. Learn the basic concepts and terminology as well as working hands-on with hardware and platforms.

Agenda Topics:

- Set up communications between the PLC and the computer
- Access, and monitor arrays, tags and user-defined data types
- Interpret project organization and execution
- Edit the ladder logic
- Create tags and monitor data in a routine
- Troubleshoot and repair hardware faults
- Create and learn proper file structure
- Perform backup and restore procedures
- Use search routines to locate items within a project
- Use software troubleshooting tools
- Force I/O and toggle bits
- Troubleshoot analog and digital inputs and outputs

Computer Numerical Control

Gain an understanding of the operation principals and know where to start looking for a problem. The goal of this basic course is to be able to intelligently discuss a machine problem with other engineers. A more advanced course is also offered and will be customized to your goals.

Agenda Topics:

- Metal cutting and how it affects the machine
- Commands such as G, F, M, S and T codes
- Control types, software versions, machine models
- Machine control handles movement and I/O
- Diagnostic and ladder logic screens to trace errors
- Fanuc and machine alarms
- Control screens for diagnosing errors
- Safely test the major components
- Troubleshoot analog and digital inputs and outputs

Related Courses

Troubleshooting Electrical Control Circuits

This is a basic course, without any prerequisites, that helps you develop a solid foundation on which to build your troubleshooting knowledge and skills. You will learn techniques that will help locate faults quickly.
Go to page 13 for more details.

Understanding and Troubleshooting Electric Motors

Learn the basics of electric motors including how to maintain and troubleshoot common problems found in the workplace.
Go to page 18 for more details.

Programmable Logic Controllers

Focus on the fundamentals of PLCs from setting up communications to uploading and downloading programs to troubleshooting and modifying the system.
Go to page 16 for more details.

Understanding and Troubleshooting Electric Motors

Learn the basics of electric motors including how to maintain and troubleshoot common problems found in the workplace.

This course covers the operation and maintenance of AC and DC motors, including 3-phase, dual voltage and multiple speed motors. For each motor application, factors such as driven load, environmental conditions, power availability and performance capabilities will help determine what type of motor is the best fit for a given purpose.

The National Electrical Code® (NEC) requirements for motor operation and installation is also covered. Course content progresses logically from basic operational theory to the actual operation of various types of AC and DC motors. The training includes numerous hands-on lab exercises designed to help participants operate, test and troubleshoot electric motors.

Agenda Topics:

- Basic motor theory
- Nameplate data
- Three-Phase motors
- National Electric Code® and motors
- Single-phase motors
- DC motors

Introduction to Industrial Electronics

Learn the fundamental concepts, symbols and components of electronic circuits. Sharpen your troubleshooting skills to help reduce downtime of equipment. You will work with real world industrial components and circuits and wire electronic circuits using schematic diagrams, testing the circuit for proper operation.

Participants will gain invaluable experience using and understanding common electronic test equipment, such as, oscilloscopes, signal generators, power supplies and multimeters to verify electronic operation. The course covers all aspects of industrial electronics, including Ohm's law, terminology, common circuits, test equipment and safety. Theory and explanations support numerous hands-on exercises.

Agenda Topics:

- Electronics fundamentals
- Resistance and basic circuit laws
- Electromagnetics and inductance
- Capacitance
- AC resistive, capacitive and inductive circuits
- Semiconductor devices
- Linear integrated circuits
- Photoelectronics
- Soldering considerations
- Meter types

Related Courses

Electrical Safety Practical Skills

Review current OSHA standards that apply to your facility and the effects of the NFPA 70E standards on your high voltage areas. Learn the electrical hazards in switch gear rooms, as well as safe switching procedures and documentation of electrical equipment.
Go to page 7 for more details.

Programmable Logic Controllers Automation Systems

Learn how operator interfaces (OIs), or human machine interfaces (HMIs) integrate with a PLC to access information about the machine.
Go to page 16 for more details.

Variable Frequency Drives

Learn proper design recommendations to ensure that your equipment is as energy efficient and safe as possible. Discover the best practices for frequency drives in HVAC, pumping and facility applications. Approximately 50% of these systems are running in bypass which usually results in higher energy costs.
Go to page 20 for more details.

Introduction to Instrumentation and Process Control

Understand instrumentation and process control to become more valuable as your skill set expands. You'll spend approximately 50% of the time working in hands-on labs exercises with various instruments and controllers. You will learn to program, connect input/output devices, as well as how to troubleshoot process controls including sensors, transmitters, controllers and final elements.

Use various instruments to measure temperature, pressure, flow rate, level and position, pH and analysis and weight and density. Understand the differences between open and closed-loop controls, feedback and feed forward controls, PLC, DCS, and stand-alone controllers. Find out how analog signals are produced, processed and protected from noise and differences in proportional, PI and PID control strategies. Understand what causes errors in instruments and how to minimize and troubleshoot them. Learn to calibrate transmitters and tune controllers.

Agenda Topics:

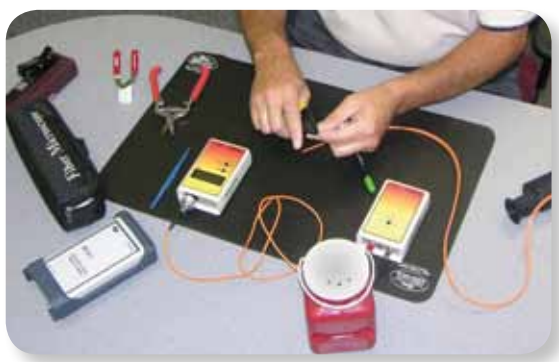
- Basic concepts
- Piping and instrument diagrams (P and IDs)
- Control technologies
- Basic electrical and math concepts
- Pressure instrumentation and measurements
- Flow instrumentation and measurements
- Level instrumentation and measurements
- Density, specific gravity and analysis
- Manipulating the process
- Troubleshooting
- Controllers
- Control systems

Fiber Optic Network Installation and Maintenance

Maintain your fiber optic network and learn the skills to minimize network downtime. Learn the ins and outs of design considerations and specification requirements. Work on budget/loss analysis techniques for fiber optic circuits. Learn safety requirements and proper techniques for terminating and splicing fiber. Upon completion of the training, students have the option to take a Fiber Optic Association exam to become a Certified Fiber Optic Technician (CFOT) or an Advanced Fiber Optic Technician (AFOT).

Agenda Topics:

- Basics
- Cables
- Connectors, splices and terminations
- Networks and design considerations
- Installation requirements
- Test equipment



Related Courses

Computer Numerical Control

Gain an understanding of the operation principals and know where to start looking for a problem. The goal of this basic course is to be able to intelligently discuss a machine problem with other engineers. A more advanced course is also offered and will be customized to your goals.
Go to page 17 for more details.

Load Banking

Learn the electrical safety requirements, purposes and procedures for load banking generators and power systems. Technicians often work alone at remote locations and must select and use personal protective equipment (PPE) and safe work practices on their own.
Go to page 15 for more details.

2015 NFPA 70E/Arc Flash Electrical Safety

Learn how current 2015 NFPA 70E standards apply to a facility, why safe electrical work practices are important, and what can be done to ensure your organization meets all government standards for electrical safety.
Go to page 6 for more details.

Variable Frequency Drives

Learn proper design recommendations to ensure that your equipment is as energy efficient and safe as possible. Discover the best practices for frequency drives in HVAC, pumping and facility applications. Approximately 50% of these systems are running in bypass which usually results in higher energy costs. Whether in facility maintenance, chilled water systems, waste water systems or manufacturing, this course unlocks the secrets of VFDs to maintain your equipment.

In the hands-on lab portion you will use scopemeters to see how improper designs can lead to motor deterioration and other problems. You will also spend over 50% of the time programming and troubleshooting newly upgraded equipment that includes Allen-Bradley Powerflex4 and ABB ACS-350 variable frequency flux vector drives.

Agenda Topics:

- Introduction
- Motor/drive/control system design and overview
- Power transmission, relationship and formulas
- Maintenance recommendations and special considerations
- AC induction motors
- Operating on variable frequency
- Variable speed drives
- Motor specifications: Mating motor for variable speed drive operations—MGI
- Operations, set up and maintenance of VSD
- Selection and application for drives
- Enclosure sizing for heat dissipation

Tuning DDC / Process Control Loops

Optimize your process with proper setting and tuning of DDC or control loops to increase quality consistency. Learn the process characteristics that become the basis for tuning the DDC or process controller.

Practice different tuning methods to ensure accurate control. Gain an understanding of the functions of proportional band, integral and derivative process in a 3-mode or DDC controller.

Agenda Topics:

- Process Characteristics
- PID Controller Parameters
- Tuning Methods
- Advanced Control

Related Courses

Electrical Safety Practical Skills

Review current OSHA standards that apply to your facility and the effects of the NFPA 70E standards on your high voltage areas. Learn the electrical hazards in switch gear rooms, as well as safe switching procedures and documentation of electrical equipment.
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Air Conditioning and Refrigeration

When your HVAC system runs safely and efficiently, energy and maintenance costs are reduced. Learn how to maintain the peak efficiencies of your systems which will minimize the downtime spent on maintenance and maximize your energy efficiency.

This course covers the basics of servicing and troubleshooting air conditioning equipment, while expanding your knowledge of ventilation systems.

Learn how to troubleshoot air conditioning system electrical and mechanical problems, and how to legally recover, recycle, and reclaim refrigerants.

NTT is a proctor for the HVAC Certification Exams—ESCO 608, 410A and Test of Excellence. If you are scheduled to take the test, you receive a free copy of the EPA Certification Exam Preparatory Manual.

Agenda Topics:

- Thermodynamics
- Vapor-compression refrigerator cycle
- Refrigerants and refrigerant oils
- Refrigeration equipment components
- AC systems
- Compressors
- Evaporators
- Metering devices
- Condensers
- Electrical components and fundamentals
- Psychrometrics

Principles of Heating Applications

Learn how to maintain peak efficiencies of HV systems while minimizing the risk of downtime due to unscheduled maintenance and repair.

Since HV system problems are electrical, this course teaches you the proper procedures and equipment for electrical safety testing.

Electrical test meters are also important. These skills are practiced in hands-on exercises with the actual type of test instruments, such as an ohmmeter, voltmeter and ammeter.

Agenda Topics:

- Gas fired heating systems: design and operation
- Controls and control systems
- Gas fired heating systems: maintenance and troubleshooting
- Psychrometrics
- Electrical components of HVAC systems
- Maintenance and troubleshooting of furnace and rooftop units

Related Courses

HVAC Pneumatic Comfort Controls

Learn about the types of control systems to maintain indoor environments. Understand the functions of the various components, relays, transmitters and receiver controllers.
Go to page 24 for more details.

Water and Air Balancing

Learn every aspect of testing, adjusting and balancing, including the instruments required. Experience the different methods to adjust constant volume, single zone, dual duct, induction, and variable air volume systems.
Go to page 23 for more details.

Brazing

Learn guidelines to select the most suitable process for joining copper and copper alloy components in air conditioning and refrigeration system. Discover cost effective installation methods that are also clean and debris free.
Go to page 23 for more details.

Chillers: Operations and Maintenance

It is imperative that your water cooling systems operate at maximum efficiency. In this hands-on course, you will receive the critical information needed to increase your system's reliability. Learn how chillers work and what causes their problems. Plus, you will get the most up-to-date information on the latest technology that will help you maintain your system at peak performance.

Gain hands-on practice and knowledge of instruments and test meters. Learn how to collect data and evaluate the operating equipment. Become familiar with approach temperature and to interpret it in terms of the system operation.

Learn preventive maintenance and troubleshooting methods to ensure the system is always operating with the most efficiency and cost savings.

Upon request, we offer free 608, 410A EPA and HVAC Excellent Technician Certificate testing at the end of this class.

Agenda Topics:

- Chilled water systems
- Thermodynamics
- Refrigeration theory
- Refrigeration prime movers
- Evaporators and liquid coolers and condensers
- Metering (expansion) devices
- Controls and control systems pumps
- Piping systems
- Conditioned space systems
- Closed-loop system fluids
- Heat rejection systems
- Open system water quality
- Heat recovery systems
- Thermal storage systems

Boilers: Technical and Operational Workshop

Does your boiler system run flawlessly? Has the everyday wear and tear on it made it unreliable? In this hands-on course taught by boiler system experts, you will learn about the common failures of boiler systems and how to prevent them. All of your questions will be answered to help make your system run more efficiently. You will leave with a better understanding of boiler construction, preventive maintenance and safe work practices.

Agenda Topics:

- Operator responsibilities
- Thermodynamics
- Boiler basics
- Boiler types and details
- Codes and standards
- Classification of boiler fuels combustion systems and fuel-burning equipment
- Combustion theory and tuning controls
- Emissions
- Water treatment
- Plant operations maintenance and repairs
- Efficiency improvements

Related Courses

Centrifugal Pumps

Increase your understanding and knowledge of centrifugal pumps including their design, selection, operation and maintenance. Moreover, the course will aid you in increasing productivity and reducing costly downtime.
Go to page 24 for more details.

Welding Principles and Procedures

Update your knowledge about various welding processes used for fabrication or manufacturing. Increase your understanding of applied metallurgy and your knowledge of weld references on welding prints
Go to page 30 for more details.

Principles of Heating Applications

Learn how to maintain peak efficiencies of HV systems while minimizing the risk of downtime due to unscheduled maintenance and repair.
Go to page 21 for more details.

Water and Air System Balancing

Learn every aspect of testing, adjusting and balancing, including the instruments required. Experience the different methods to adjust constant volume, single zone, dual duct, induction, and variable air volume systems. Complete details are provided for balancing devices and instrument usage. Learn to calculate the CFM from heat flow and use established equations and a conversion tables. Go through proper testing procedures and evaluation techniques.

Agenda Topics:

- HVAC testing and balancing
- Airside balancing procedure
- Waterside balancing procedure
- Airflow management
- Calculation of CFM from heat flow
- Kitchen ventilation
- Principles and procedures for balancing hydronic systems
- Automatic valves
- Constant volume water-balancing procedure
- Variable volume water-balancing procedure
- Expansion or compression tanks
- Series loop
- Basic testing of water-cooled and air-cooled chillers
- Field performance testing of chillers
- Cooling tower testing

Brazing for Air Conditioning and Refrigeration

Learn guidelines to select the most suitable process for joining copper and copper alloy components in air conditioning and refrigeration system. Discover cost effective installation methods that are also clean and debris free.

Learn brazing, proper procedures for flaring, swaging and leak testing techniques, while ensuring safety and standard compliance.

Agenda Topics:

- Selection of a joining process
- Bolting and riveting
- Adhesive bonding
- Soldering
- Copper, solid or plates, tin-bronzes, gunmetals
- Gilding metals and commercial brasses
- Filler metals
- Basic brazing principles
- Brazing process with different metals
- Physical and metallurgical factors
- Alloy properties
- Joint design
- Pre-weld and inter-run cleaning
- Jigging and backing techniques
- Process applications
- Work-hardening and precipitation-hardening
- Joining and repairing castings
- Metallurgical factors in joining dissimilar metals

Related Courses

NFPA 79: Electrical Standards for Industrial Machinery

Get an overview of scope of the NPFA 79. Learn how to effectively use the Standard as a guideline for wiring, sizing conductors and overcurrent protection for industrial machines operating form a nominal voltage of 600 volts or less.

Go to page 9 for more details..

Chillers: Operation and Maintenance

Gain hands-on practice and knowledge of instruments and test meters. Learn how to collect data and evaluate the operating equipment.

Go to page 22 for more details.

Air Conditioning and Refrigeration

This course covers the basics of servicing and troubleshooting air conditioning equipment, while expanding your knowledge of ventilation systems.

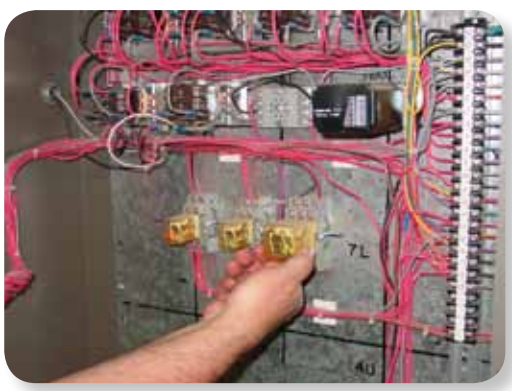
Go to page 21 for more details.

HVAC Pneumatic Comfort Controls

Learn about the types of control systems to maintain indoor environments. Understand the functions of the various components, relays, transmitters and receiver controllers. Learn the functional difference between direct and reverse acting controllers.

Agenda Topics:

- Fundamentals of air conditioning
- Pneumatic supply system
- Pressure regulators
- Thermostats
- Final control assemblies
- Relays and switches
- Receiver-controller systems
- Automatic control systems
- Direct digital control



Centrifugal Pumps

Increase your understanding and knowledge of centrifugal pumps including their design, selection, operation and maintenance. Moreover, the course will aid you in increasing productivity and reducing costly downtime.

The hands-on lab exercises demonstrate and reinforce the practical techniques of maintenance and troubleshooting. It is important to understand what a pump is and how it works in order to solve problems. There are many misconceptions about pumps. We will explain the basics so that you will be adequately prepared to understand certain design considerations, including sizing. In addition, this course provides the inside information on why and how centrifugal pumps are designed.

Agenda Topics:

- Pump operation and design
- System curves
- Pumping systems
- Calculate pump energy costs
- Cause of wear
- Hydraulic theory and design
- Installation, maintenance and troubleshooting

Related Courses

Welding Principles and Procedures

Update your knowledge about various welding processes used for fabrication or manufacturing. Increase your understanding of applied metallurgy and your knowledge of weld references on welding prints.

Go to page 30 for more details.

Brazing for Air Conditioning and Refrigeration

Learn guidelines to select the most suitable process for joining copper and copper alloy components in air conditioning and refrigeration system. Discover cost effective installation methods that are also clean and debris free.

Go to page 23 for more details.

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The National Electrical Code® is used by all states for industry-wide electrical standards. Ensure your organization is in compliance. This course benefits individuals who are either at an introductory level or who are experienced in working with electrical systems significantly increase their knowledge, skill level and confidence.

Go to page 12 for more details.

Mechanical Drives/ Power Transmission

Learn to install and maintain mechanical drives. Examine all the common mechanical drives including belts, chains and gears. Learn the roles of proper lubrication, bearings, proper alignment and fastening techniques, troubleshooting, spotting the symptoms of failure and selection of the appropriate remedy.

This is an excellent cross-training opportunity for plant and process engineers, maintenance mechanics, supervisors, machinery designers and field service personnel.

Agenda Topics:

- Introduction: mechanical power transmission
- Prime movers
- Bushings, keys and keyways
- General lubrication considerations
- Belt drive systems
- Gear drive systems
- Chains
- Couplings
- Clutches and brakes
- Mechanical variable speed drives

Bearings and Lubrication

Gain the knowledge and techniques to significantly reduce operating and energy costs and extend the life of your rotating equipment.

Learn the different bearing systems, including their function, load tolerance and lifespan. Discover how to anticipate maintenance requirements, reduce unnecessary system downtime and correct the situation quickly and effectively.

This course will help anyone who has to specify, purchase, install, maintain or repair bearing based systems.

Agenda Topics:

- Power-transmission physics
- Types of bearings
- Installation and maintenance of bearings
- Troubleshoot bearing failures
- Select bearings
- Shaft and housing fits
- Bearing materials of construction
- Types and installation of precision ball bearings
- Tapered roller bearings
- Select the right lubricant, method and amount
- Properties
- Test procedures
- Flash and fire points
- Bearing operating environment
- Couplings and alignment
- Power-transmission formulas
- Conversions

Related Courses

Machine Tool Alignment Concepts

Designed for equipment services personnel, this course will give you the basic concepts of machine tool alignment, and the use of common tool and instruments used for maintenance of machine tools.
Go to page 31 for more details.

Chillers: Operation and Maintenance

Gain hands-on practice and knowledge of instruments and test meters. Learn how to collect data and evaluate the operating equipment.
Go to page 22 for more details.

Shaft Alignment

Proper alignment of rotating machinery can help cut your energy costs and increase the “in-production” time of your equipment, lower your maintenance costs and increase bearing life.
Go to page 26 for more details.

Shaft Alignment

Proper alignment of rotating machinery can help cut your energy costs and increase the "in-production" time of your equipment, lower your maintenance costs and increase bearing life.

Learn to identify the symptoms of misaligned rotating machinery. Then use the proper tools to correct a multitude of issues ranging from piping induced stress to soft foot to run out.

Combine computer software technology with your hands-on skills to help with shaft alignment.

Agenda Topics:

- Align two pieces of rotating machinery
- Soft foot
- Run out
- Symptoms of misaligned rotating machinery
- Piping induced stress problems
- Tools and techniques to control lateral movement of machinery
- Accurate alignment
- Measuring misalignment
- Measure alignment with different coupling types
- Checking alignment
- Supervising contractors
- Alignment systems
- Computer software programs

Conveyor Systems

This course is designed to teach maintenance personnel Conveyor System components so they first understand the system. This enables them perform proper maintenance and troubleshooting to enable a preventative/planned maintenance approach to system maintenance.

Agenda Topics:

- Troubleshoot a lack of pressure in the system
- Diagnose why there is not any fluid in the system
- Use measurement instruments detects true cavitations
- Find the cause of a frequently blown shaft seal on a hydraulic pump
- Discover the sources of excessively high fluid temperature
- Find the cause of excessive high fluid pressures
- Understand conveyor system components
- Perform proper maintenance and troubleshooting of conveyors
- Have a planned/preventative maintenance approach to system maintenance for both Hydraulics and Conveyor systems

Related Courses

Bearings and Lubrication

The Bearings and Lubrication Principles course gives you the knowledge and techniques to significantly reduce operating and energy costs and extend the life of your rotating equipment.
Go to page 25 for more details.

Maintenance Manager

A well run maintenance organization can have a positive impact on company profits. Take the opportunity to learn how to build a comprehensive maintenance program for your team.
Go to page 31 for more details.

Mechanical Drives/ Power Transmission

Learn to install and maintain mechanical drives. Examine all the common mechanical drives including belts, chains and gears.
Go to page 25 for more details.

Ball Screw Applications and Techniques

The various types of ball screws will be examined with a discussion of their appropriate applications. In particular the differences between rolled ball screws and ground ball crews will be analyzed in depth. Learn the importance of inspection of new ball screws prior to installation. Proper handling and alignment techniques will be covered.

Agenda Topics:

- Terminology
- Types of ball screws
- Nut housing
- Preload configurations
- Ball screw alignment process
- Deflection method
- Initial machine familiarization process guide

3-Axis Machine Tool Alignment

Designed for equipment services personnel, this course will give you the basic concepts of 3-axis machine tools and how to properly perform alignments.

Agenda Topics:

- Machine tool nomenclature
- Check and adjust level, straightness and parallel
- Adjust machine tool level
- Measure geometries in 3 axis (XY, YZ, ZX)
- Adjust geometries to manufacturers' specification
- Check (x axis) table for level and flatness, rise and fall
- Check spindle taper
- Check spindle run out
- Check spindle tram (sweep) for square
- Check for lost motion (mechanical looseness)
- Check for positioning error (not part of alignment)
- Troubleshooting techniques

Related Courses

NFPA 79: Electrical Standards for Industrial Machinery

Get an overview of scope of the NPFA 79. Learn how to effectively use the Standard as a guideline for wiring, sizing conductors and overcurrent protection for industrial machines operating from a nominal voltage of 600 volts or less.
Go to page 9 for more details.

5-Axis Machine Tool Alignment

Designed for equipment services personnel, this course will give you the basic concepts of 5-axis machine tools and how to properly perform alignments.
Go to page 28 for more details.

Introduction to Instrumentation and Process Control

Understand instrumentation and process control to become more valuable as your skill set expands. Learn to program, connect input/output devices and to troubleshoot process controls.
Go to page 19 for more details.

5-Axis Machine Tool Alignment

Designed for equipment services personnel, this course will give you the basic concepts of 5-axis machine tools and how to properly perform alignments.

Agenda Topics:

- Define 5 (plus) axis machine tool nomenclature
- Machine configurations
- Machine axis
- Review and confirm XYZ geometries
- Check and adjust B axis alignments
- Check and adjust A axis alignments
- Check and adjust alignment of rotary table (center line of rotation and rise and fall)
- Spindle gauge line
- Spindle taper
- Spindle run out
- Spindle trams
- Positioning accuracy for each axis
- Check and adjust counter balance operation
- Effective troubleshooting techniques

Hydraulics Training and System Troubleshooting

Learn the basic hydraulic components, how they work and their function in a hydraulic circuit. You will be able to understand and interpret hydraulic schematics, and implement safe work practices.

The extreme flexibility of hydraulic elements can create a number of problems. Learn how fluids must be positively confined through the entire system and prevented from going anywhere except where we want them to go.

Using the hands-on hydraulic trainers you will construct, operate and troubleshoot systems using common hydraulic components.

Agenda Topics:

- Hydraulic principles
- Hydraulic pumps
- Flow, pressure and directional control valves
- Hydraulic cylinders
- Hydraulic motors
- Accumulators
- Hydraulic fluids
- Fluid conductors
- Reservoirs, heating exchangers and filters
- Troubleshooting – basic requirements
- Principles of motion and force
- Noisy pumps or cavitation and aeration
- Low, erratic or no pressure
- Contamination in valves no movement of actuator
- Noise control
- Cylinder and circuit problems
- Solenoid failure
- Leakage control

Related Courses

Computer Numerical Control

Gain an understanding of the operation principals and know where to start looking for a problem. The goal of this basic course is to be able to intelligently discuss a machine problem with other engineers.

Go to page 17 for more details.

Bearings and Lubrication

The Bearings and Lubrication Principles course gives you the knowledge and techniques to significantly reduce operating and energy costs and extend the life of your rotating equipment.

Go to page 25 for more details.

Substations: Safety, Operations & Maintenance

Learn the best practices for electrical equipment safety testing. This intensive training program covers air-magnetic and vacuum circuit breakers found in most facilities from 2.3kV through 15kV.

Go to page 10 for more details.

Pneumatic Systems and Principles

This is an introduction to the real-world of pneumatic control and power transmission. Learn the full scope of compressed air production, preparation and distribution. Learn to apply simple gas laws and to read appropriate symbols to understand component technologies.

Improve your ability to install, maintain and troubleshoot pneumatic automation systems.

Agenda Topics:

- Pneumatic principles
- Air compression
- After coolers and air dryers
- Pneumatic piping systems
- Pneumatic actuators
- Acting cylinder—4-way valve
- Pilot operated indirect control
- Memory control
- Automatic cylinder return
- Valve—logic or gate
- Two pressure valve—logic and gate
- Flow control
- Quick exhaust
- Compressed-air-drive vacuum pumps
- Time delay
- Pressure regulators
- Sequence valve

Electro-Pneumatics Training

This interactive training program is for engineering, maintenance, operations and management personnel who encounter pneumatic power control and systems during the course of their daily functions. They many directly or indirectly encounter installing, maintaining, troubleshooting, buying or specifying pneumatic power equipment.

The program introduces the real world of the hybrid technology of electro-pneumatics. After a brief introduction to compressed air technology, you will learn and understand the electrical ladder diagram, along with components and their symbols.

Through hands-on exercises, learn everything about the control of pneumatic actuators, latching of electrical signals, logic controls, timers, and counters. All the hands-on exercises are real world applications and can be used on most of the industry's automated equipment. Upon completion of this training, you will be able to successfully install, maintain, and troubleshoot electro-pneumatic systems and components.

Agenda Topics:

- Introduction to pneumatics
- Introduction the electric ladder diagram
- Ladder diagrams
- Components
- Solenoid valves
- Control of actuators
- Latching electrical signals
- Logic control
- Timers and counters
- Emergency stops

Related Courses

Machine Tool Alignment Concepts

Designed for equipment services personnel, this course will give you the basic concepts of machine tool alignment, and the use of common tool and instruments used for maintenance of machine tools.
Go to page 31 for more details.

Maintenance Manager

A well run maintenance organization can have a positive impact on company profits. Take the opportunity to learn how to build a comprehensive maintenance program for your team.
Go to page 31 for more details.

3-Axis Machine Tool Alignment

Designed for equipment services personnel, this course will give you the basic concepts of 3-axis machine tools and how to properly perform alignments.
Go to page 27 for more details.

Hoisting and Rigging

NTT will customize this course to fit your needs. Depending on materials your team transports, the focus can be on aspects of rigging safety, calculating the weight of the load, common hitch types, common sling types, ropes, locating the load's center of gravity, gaining a mechanical advantage and more.

Gain proper inspection disciplines, techniques and schedules. There should be periodic detailed inspection and maintenance that go beyond daily inspection to help avoid many accidents and prevent faulty equipment from going back into service.

This course covers many industries: mining, electrical facilities, transportation, construction, military, forestry, fire fighting, lumber production, and rope rescue. The practical knowledge gained will deliver a tangible improvement in both safety and on-the-job performance.

Agenda Topics:

- Introduction to rigging safety
- Calculate the weight of the load
- Rigging hardware
- Common types of slings
- Common types of hitches
- Ropes
- Load's center of gravity
- Knots, hitches, bends, anchors, forming taglines for large loads
- Temperature, chemicals, sunlight, abrasion
- Strength loss from knots, tight bends, etc.

Welding Principles and Procedures

Update your knowledge about various welding processes used for fabrication or manufacturing. Both engineers and welding operators will learn about the factors that impact weld quality. Increase your understanding of applied metallurgy and your knowledge of weld references on welding prints.

Discover the importance of following safety guidelines and approved welding procedures. You'll also learn the basics of troubleshooting weld defects. This course material is in accordance with American Welding Society standards.

Agenda Topics:

- Understanding metals
- Introduction to arc welding
- Shielded metal arc welding (stick)
- Gas metal arc welding (MIG)
- Flux cored arc welding (FCAW)
- Metal cored arc welding (MCAW)
- Gas tungsten arc welding (TIG)
- Welding and cutting safety electric arc welding equipment
- Oxy-acetylene flame cutting/gouging
- Oxy-acetylene welding, braze welding, brazing and soldering
- Air carbon gouging
- Plasma arc cutting and gouging
- Welding certification requirements
- Principles of Welding Inspection
- Understanding Weld Prints
- Repair welding principles and procedures

Related Courses

HVAC Pneumatic Comfort Controls

Learn about the types of control systems to maintain indoor environments. Understand the functions of the various components, relays, transmitters and receiver controllers.
Go to page 24 for more details.

Brazing for Air Conditioning and Refrigeration

Learn guidelines to select the most suitable process for joining copper and copper alloy components in air conditioning and refrigeration system. Discover cost effective installation methods that are also clean and debris free.
Go to page 23 for more details.

Air Conditioning and Refrigeration

This course covers the basics of servicing and troubleshooting air conditioning equipment, while expanding your knowledge of ventilation systems.
Go to page 21 for more details.

Injection Molding

High scrap rates reduces efficiency and profits! This workshop teaches participants to recognize and differentiate causes of poor quality directly related to manufacturing errors and molding deficiencies. Discussed is an overview of injection molding problems, their causes and, steps to resolve them. Polymer flow characteristics and the complex relationship of materials design and process will be explained in understandable terms. Each student will learn to recognize the origin of a molded defect such as: Surface Quality, Burning, Contamination, Mechanical- Physical deficiencies, Part Size, Geometry, and Structural Defects. 47-common molding problems will be visually reviewed and open to discussion. To enhance this workshop, *Lean Manufacturing for Injection Molding* and *Scientific Injection Molding* will be reviewed and shown how they will help the molding company become efficient and productive.

Agenda Topics:

- Air Streaks
- Brittleness
- Bubbles
- Contamination
- Grove and Gouge Marks
- Knit-Line Formation
- Moisture Streaking
- Push Marks
- Rainbow Effects
- Splay Marks (moisture/burning
- Warp/Warping
- Along with 30 other Defects

Machine Tool Alignment Concepts

Designed for equipment services personnel, this course will give you the basic concepts of machine tool alignment, and the use of common tool and instruments used for maintenance of machine tools.

Agenda Topics:

- Configuration and classifications
- Standards for ACES designations
- Machine tool construction material
- Foundations and designs
- Components and construction for machining centers
- Machine geometry, positioning and alignment
- ANSI standards
- ASME B5.54

Related Courses

Hydraulics Training and System Troubleshooting

Learn the basic hydraulic components, how they work and their function in a hydraulic circuit. You will be able to understand and interpret hydraulic schematics, and implement safe work practices.
Go to page 28 for more details.

Introduction to Instrumentation and Process Control

Understand instrumentation and process control to become more valuable as your skill set expands. Learn to program, connect input/output devices and to troubleshoot process controls including sensors, transmitters, controllers and final elements.
Go to page 19 for more details.

2015 NFPA 70E/Arc Flash Electrical Safety

Learn how current 2015 NFPA 70E standards apply to a facility, why safe electrical work practices are important, and what can be done to ensure your organization meets all government standards for electrical safety.
Go to page 6 for more details.

Fluid Power Connector & Conductor Certification

The success or failure of any fluid power system depends on four factors: design, installation, start-up (commissioning), and maintenance. Hose and tube assemblies are a vital consideration in each of these factors as well as system and operating personnel safety.

All Connector & Conductor certifications require a three (3)-hour written and a three (3)-hour job performance (hands-on) test.

NOTE: Students must register with the IFPS (International Fluid Power Society) at least 30-days prior to class dates.

Agenda Topics:

This class is a review in preparation for taking the Connector & Conductor certification exam for which you will need to demonstrate:

- Understand basic components of hose construction
- Identify hose types and pressure ratings
- Identify port and fitting threads using measuring tools and charts
- Identify the various two- and four-bolt flanges
- Use appropriate charts to determine ratings for stainless and carbon steel tubing for application
- Use the "Stamped" acronym to determine the correct hose and/or tube for correct assembly procedure
- Understand metric and English values to ensure correct assembly of components
- Square-cut hose to measured length
- Know when and how to skive hose
- A study manual will be provided ahead of time for candidates to prepare for the Connector & Conductor certification exam.

Fluid Power Hydraulic Specialist Certification

The International Fluid Power Society is the only organization that provides comprehensive technical certifications for all professionals in the fluid power and motion control industry.

- IFPS certification tests provide an objective, third-party assessment of an individual's skill level and are recognized industry-wide. Individuals who successfully master a level of competency are issued a credential signifying an elevated status in the workforce.
- A Hydraulic Specialist designs systems and writes specifications, sizes and selects hydraulic components for mobile and industrial machinery.

Agenda Topics:

This class is a review in preparation for taking the Industrial Hydraulic Specialist certification exam for which you will need to demonstrate:

- Basic Principles, Concepts, and Terminology
- Load and Motion Analysis
- System Analysis and Troubleshooting
- System Design
- Fluids, Fluid Conductors, Fluid Filtration
- Control Components and Systems
- All Hydraulic Specialist certifications require a three(3)-hour written test.
- A study manual will be provided ahead of time for candidates to prepare for the Hydraulic Specialist certification exam.

Related Courses

Machine Tool Alignment Concepts

Designed for equipment services personnel, this course will give you the basic concepts of machine tool alignment, and the use of common tool and instruments used for maintenance of machine tools. *Go to page 31 for more details.*

Hydraulics Training and System Troubleshooting

Using the hands-on hydraulic trainers you will construct, operate and troubleshoot systems using common hydraulic components. *Go to page 28 for more details.*

Conveyor Systems

This course is designed to teach maintenance personnel Conveyor System components so they first understand the system. *Go to page 26 for more details.*

Fluid Power Industrial Hydraulic Technician Certification

The International Fluid Power Society is the only organization that provides comprehensive technical certifications for all professionals in the fluid power and motion control industry.

- IFPS certification tests provide an objective, third-party assessment of an individual's skill level and are recognized industry-wide. Individuals who successfully master a level of competency are issued a credential signifying an elevated status in the workforce.
- An Industrial Hydraulic Technician applies fluid power theory and related knowledge to test and troubleshoot operational industrial hydraulic systems and applications, reads industrial application schematics, does basic cylinder & hydraulic motor calculations.

Agenda Topics:

This class is a review in preparation for taking the Industrial Hydraulic Technician certification exam for which you will need to demonstrate:

- You'll learn to read and understand hydraulic symbols and comprehend basic hydraulic principles.
- You'll learn to understand the function and design of hydraulic components, basic hydraulic circuits and system controls.
- This seminar consists of three days of intensive review and hands –on practice for the Industrial Hydraulic Technician certification test which will be held on the fourth day.
- All Industrial Hydraulic Technician certifications require a three (3)-hour job performance (hands-on) test and a three (3)-hour written test.
- A study manual will be provided ahead of time for candidates to prepare for the Industrial Hydraulic Technician certification exam.

Fluid Power Industrial Hydraulic Mechanic Certification

The International Fluid Power Society is the only organization that provides comprehensive technical certifications for all professionals in the fluid power and motion control industry.

- IFPS certification tests provide an objective, third-party assessment of an individual's skill level and are recognized industry-wide. Individuals who successfully master a level of competency are issued a credential signifying an elevated status in the workforce.
- An Industrial Hydraulic Mechanic fabricates, assembles, services, maintains, and tests industrial hydraulic equipment. The mechanic understands hydraulic symbols, reads system schematics, understands electrical principles, and is skilled in using hand tools, power tools, micrometers, and testing equipment.

Agenda Topics:

This class is a review in preparation for taking the Industrial Hydraulic Mechanic certification exam for which you will need to demonstrate:

- You'll learn preventative maintenance techniques, fluid filtration, component assembly, field repairs and shop repairs.
- You'll learn to understand hydraulic symbols, read system schematics, understand electrical principles, use hand tools, micrometers, and testing equipment.
- This seminar consists of three days of intensive review and hands –on practice for the Industrial Hydraulic Mechanic certification test which will be held on the fourth day.
- All Industrial Hydraulic Mechanic certifications require a three (3)-hour job performance (hands-on) test and a three(3)-hour written test.
- A study manual will be provided ahead of time for candidates to prepare for the Industrial Hydraulic Mechanic certification exam.

Related Courses

Pneumatic Systems and Principles

Improve your ability to install, maintain and troubleshoot pneumatic automation systems. *Go to page 29 for more details.*

Fundamentals of Programmable Logic Controllers

Focus on the fundamentals of PLCs from setting up communications to uploading and downloading programs to troubleshooting and modifying the system. *Go to page 16 for more details.*

Hydraulics Training and System Troubleshooting

Using the hands-on hydraulic trainers you will construct, operate and troubleshoot systems using common hydraulic components. *Go to page 28 for more details.*

Fluid Power Mobile Hydraulic Mechanic Certification

Fabricates, assembles services, maintains, and tests mobile hydraulic equipment. The mechanic understands hydraulic symbols, reads system schematics, and is skilled in using hand tools, power tools, micrometers and testing equipment. All Mechanic certifications require a three (3) hour written and a three (3) hour Job Performance (hands on) test.

Agenda Topics:

This class is a review in preparation for taking the Mobile Hydraulic Mechanic certification exam for which you will need to demonstrate:

- Reads hydraulic symbols and circuit diagrams
- Skilled in the use of dial calipers and micrometers
- Knowledge of various tube fittings and selecting the proper replacement
- Make up tube assemblies
- Knows how to prevent and repair system leaks
- Invaluable skills in contamination control
  - Adds fluid to system with filter cart
  - Knows how, when and where to take fluid samples
  - Aids in system flushing and commissioning
  - Has "Target Cleanliness Chart" for each system
  - Checks condition of hydraulic filters
  - Check system for water
- Makes up a crimped hose assembly
  - Replace a hose assembly
  - Inspect hose applications for twist and minimum bend radius
- Services and charges accumulators
- Assists technicians in start-up and commissioning
- Promotes safe working conditions with pressurized systems

Fluid Power Mobile Hydraulic Technician Certification

Applies fluid power theory and related knowledge to test and troubleshoot operational mobile hydraulic systems and applications. A Mobile Hydraulic Technician reads mobile schematics, performs basic cylinder and hydraulic motor calculations and is able to supervise system installations and commissioning. All Technician certifications require a three (3) hour written and a three (3) hour Job Performance (hands on) test.

Agenda Topics:

This class is a review in preparation for taking the Mobile Hydraulic Technician certification exam for which you will need to demonstrate:

- Sets-up and tests systems and components under direction of engineering and scientific staff.
- Recommends modifications to circuit and components to improve performance.
- Supervises system installation, flushing and commissioning.
- Provides leak-free piping.
- Knows how, where and when to take fluid samples and read lab reports.
- Can establish ISO cleanliness level for a system.
- Can devise the Target Cleanliness Chart.
- Understands accumulator use and operation.
- Understands hydrostatic drives.
- Sets pump load sensing and compensator controls.
- Understands basic electrical controls and their application.
- Calculates decompression volume.
- Understands regenerative circuits and their use.
- Understands sequence and counterbalance circuits and associated valving.
- Does troubleshooting and supervises required replacements, repair or adjustment.

Related Courses

Machine Tool Alignment Concepts

Designed for equipment services personnel, this course will give you the basic concepts of machine tool alignment, and the use of common tool and instruments used for maintenance of machine tools. *Go to page 31 for more details.*

Hydraulics Training and System Troubleshooting

Using the hands-on hydraulic trainers you will construct, operate and troubleshoot systems using common hydraulic components. *Go to page 28 for more details.*

Conveyor Systems

This course is designed to teach maintenance personnel Conveyor System components so they first understand the system. *Go to page 26 for more details.*

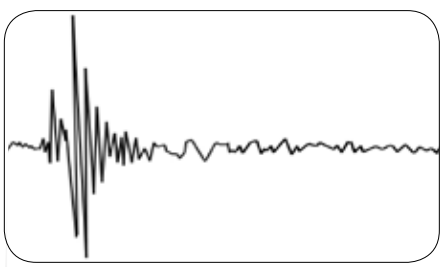
Vibration Analysis

This three day course was developed to assist individuals who work in the field on various equipment to learn how to use, read, and apply the instruments and feedbacks related to vibration on rotating machinery.

Basic vibration theory will be discussed along with the existing maintenance systems, predictive and preventative maintenance programs, and procedures for a good condition monitoring system. You may not walk out as an expert, however, you will leave the seminar with a very good understanding of what is necessary to make a valuable contribution at your facility.

Agenda Topics:

- Vibration basics
- Concepts and theories
- Instruments
- Typical Vibration Problems
- Techniques
- Machine Diagnostics
- Trending
- Acoustics



Infrared Thermography

Thermography can be used to monitor the condition of structures, plant machinery, and systems. It is a predictive maintenance technique using an infrared camera designed to monitor the emission of infrared energy. Infrared Thermography is a useful tool for maintenance of electrical and mechanical industrial systems.

Agenda Topics:

- Discuss the basics of infrared
- Demonstrate the use of an infrared camera
- Cover the theories associated with basic infrared
- Cover safety procedures
- Types of infrared problems

Related Courses

Pneumatic Systems and Principles

Improve your ability to install, maintain and troubleshoot pneumatic automation systems. *Go to page 29 for more details.*

Fundamentals of Programmable Logic Controllers

Focus on the fundamentals of PLCs from setting up communications to uploading and downloading programs to troubleshooting and modifying the system. *Go to page 16 for more details.*

Hydraulics Training and System Troubleshooting

Using the hands-on hydraulic trainers you will construct, operate and troubleshoot systems using common hydraulic components. *Go to page 28 for more details.*

2013 National Fire Alarm and Signaling Code (NFPA 72)

Being up-to-date with basics of the National Fire Alarm Code® (NFPA 72) will help improve your fire alarm and signaling system's reliability. Learn the fundamentals of fire alarm systems, fire alarm equipment for dwelling units, initiating devices, emergency communication systems (including mass notification) and more.

Gain knowledge to ensure that your fire alarm system is working properly to achieve maximum reliability, safety and compliance.

Learn to identify various components of a typical fire alarm system, recognize differences in requirements between NFPA 72, ADA (ADAAG) and UFAS documents and be able to layout a fire alarm system using basic components (i.e., manual alarm stations, alarm bells, detectors, etc.).

Agenda Topics:

- Fundamentals of fire alarm systems
- Fire warning equipment for dwelling units
- Protected premises fire alarm systems
- Supervising station fire alarm systems
- Initiating devices
- Notification appliances for fire alarm systems
- Inspecting, testing and maintenance
- The relevancy of the Fire Alarm Code® and Signaling Code

NICET® I and II Fire Alarm Systems

Prepare for the NICET Certification exams.

Learn test-taking strategies . Review reference materials needed to maximize the NICET test experience.

This class is helpful to personnel working in the fire alarm industry who engage in a combination of fire alarm system activities including layout, equipment selection, installation, acceptance testing, troubleshooting and servicing.

NICET Level I is for trainees and entry level technicians who perform limited job tasks under frequent supervision. NICET Level II is for technicians who perform routine tasks under general daily supervision.

Agenda Topics:

- Introduction to NICET
- Understand NICET operational policies
- Review the four certification criteria
- Review the examination requirement chart
- Discuss NICET test strategies
- NICET Level I element review
- NICET Level II element review

Related Courses

2014 NEC®

The National Electrical Code® is used by all states for industry-wide electrical standards. Ensure your organization is in compliance. This course benefits individuals who are either at an introductory level or who are experienced in working with electrical systems significantly increase their knowledge, skill level and confidence.
Go to page 12 for more details.

NFPA 101 Life Safety Code

Learn and/or review the requirements that influence the safety of people and protection of property and equipment.
Go to page 37 for more details.

Natural Gas Safety

Learn the general safety practices in both outside distribution systems and inside equipment piping. It will help you understand the codes and standards as applied to natural gas usage in commercial and industrial facilities.
Go to page 40 for more details.

International Plumbing Code

Learn the requirements for installation and inspection of plumbing systems to ensure your compliance with the International Plumbing Code, which is the standard for the installation and inspection of plumbing systems. It explains the proper plumbing standards for a wide variety of technicians and personnel and it establishes minimum regulations for plumbing systems using prescriptive and performance-related provisions. Learn many of the Code's details to give attendees a comprehensive view of the Code. Among many of the details that will be discussed will be a full explanation on plumbing fixtures, including prohibited fixtures.

Agenda Topics:

- Administrative concepts
- General regulations
- Fixtures, faucets and fixture fittings
- Water heater
- Water supply and distribution
- Sanitary drainage
- Indirect/special waste
- Vents
- Traps, interceptors and separators
- Storm drain
- Special piping

Lockout / Tagout Requirements and Procedures

This course presents OSHA's basic Hazardous Energy Control program and more. Review methods used to protect employees from injury due to the release of hazardous levels of energy and take an in-depth look at the regulatory standard addressing Lockout/Tagout.

This course is designed to meet and exceed the safety training requirements defined in the OSHA Control of Hazardous Energy standard paragraph 29 CFR 1910.147 and the Lockout/Tagout procedures of 29 CFR 1910.333 Selection of Work Practices.

Agenda Topics:

- Introduction to OSHA
- Definitions of hazardous energy
- Types of energy sources
- Machine guards
- Lockout/Tagout
- Develop a written program
- Program inspection requirements
- Develop Lockout/Tagout equipment checklist
- Set up employee training and communication

Related Courses

Hazard Waste Operation and Emergency Response

Learn how to respond safely to an emergency, identify the materials released, and control the spill until further response is necessary.

Go to page 38 for more details.

OSHA Safety Training

Receive the information that is necessary for you to train and inform employees properly on OSHA standards. Learn to design and implement employee protection programs. Review and discuss the OSH Act, including citation and penalties and how to avoid them.

Go to page 36 for more details.

NFPA 70E/Arc Flash Electrical Safety

Learn how current 2015 NFPA 70E standards apply to a facility, why safe electrical work practices are important, and what can be done to ensure your organization meets all government standards for electrical safety.

Go to page 6 for more details.

OSHA Safety Training

Receive the information that is necessary for you to train and inform employees properly on OSHA standards. Learn to design and implement employee protection programs. Review and discuss the OSH Act, including citation and penalties and how to avoid them. Learn how to become recognized by the U.S. Department of Labor as having been trained by an OSHA-authorized trainer.

Agenda Topics:

- Locate and apply OSHA safety and health standards, policies and procedures
- Identify common violations
- CFR Part 1930 – Inspections, Citations and Penalties
- Hazard violations
- Basic electrical safety
- Control of hazardous energy/electrical safe work practices
- Walking working surfaces, Subpart D
- OSHA instructions on Subpart D
- Materials handling and storage, Subpart N
- Introduction to industrial hygiene/bloodborne pathogens, Subpart Z
- Hazard communication/asbestos
- Permit-required confined space
- Welding, cutting and brazing, Subpart Q
- Personal protective equipment, Subpart I
- Means of egress, Subpart E
- Fire protection, Subpart L:
- Hazardous materials, Subpart H
- Basics of machine safeguarding
- Machinery and machine guarding, Subpart O
- Recordkeeping—29 CFR 1094

Confined Space Entry

This comprehensive lecture course will benefit anyone who has identified permit-required spaces and must develop a written program for identifying and evaluating hazards, preventing unauthorized entry and establishing safe entry procedures. This includes safety personnel, maintenance personnel, facility managers, supervisors and personnel who might work in confined spaces.

Agenda Topics:

- Evaluation and determination of confined spaces
- Hazards of confined spaces
- Personnel duties and responsibilities
- Non-permit spaces
- Permit space programs
- Written programs
- Training
- Entry permit
- Entry conditions
- Atmospheric testing
- Personal protective equipment
- Rescue operations Workbook
- 29 CFR 1910.146—Permit Required Confined Space

Related Courses

Hazard Communication and Bloodborne Pathogens

Receive the information that is necessary for you to train and inform employees properly on OSHA standards. Learn to design and implement employee protection programs.
Go to page 38 for more details.

Fall Protection

This course satisfies the requirements of OSHA 29 CFR 1926.502 and 1910.66 for the training of all persons who climb or work on elevated surfaces where the risk of a fall is present.
Go to page 37 for more details.

DOT Hazardous Materials

This course meets the requirement of the EPA for the initial and/or retraining of all personnel involved in hazardous waste management.
Go to page 39 for more details.

Fall protection

This course satisfies the requirements of OSHA 29 CFR 1926.502 and 1910.66 for the training of all persons who climb or work on elevated surfaces where the risk of a fall is present.

You'll learn the importance of a fall protection plan and gain knowledge about the safe use of ladders, the function of guardrails and other fall protection practices. You'll also learn about the components of a fall arrest system and when the use of a body harness may be necessary.

Agenda Topics:

- Introduction to OSHA Standards
- Fall protection plans
- Job safety analysis
- Fall protection systems
- Fall protection equipment
- Implementation of fall protection programs including policies and documentation

NFPA 101 Life Safety Code

Learn and/or review the requirements that influence the safety of people and protection of property and equipment.

This class is designed for building inspectors, building managers, facility engineers, safety inspectors, code enforcers, engineers, architects, building owners and insurers, building product manufacturers including fire suppression and alarm systems—anyone in a building-related field.

Agenda Topics:

- General, Sections 1-1 through 1-8
- Fundamental requirements
- Definitions, Sections 3-1 through 3-2
- Classification of occupancy and hazard of contents
- Means of Egress, Section 5-1 through 5-12
- Features of Fire Protection Section 6-1 through 6-6
- Building service and fire protection equipment, Section 7-1 through 7-7
- Means of egress requirements
- Protection, special provisions, building services and services and operating features.
- One and two family dwellings, Section 21-1 through 21-4
- Small facilities. large facilities, suitability of an apartment building to house, a board and care occupancy and operating features.

Related Courses

2013 National Fire Alarm Code (NFPA 72)

Learn the fundamentals of fire alarm systems, fire alarm equipment for dwelling units, initiating devices, emergency communication systems (including mass notification) and more.

Go to page 34 for more details.

Lockout/Tagout Requirements and Procedures

Review methods used to protect employees from injury due to the release of hazardous levels of energy and take an in-depth look at the regulatory standard addressing Lockout/Tagout.

Go to page 35 for more details.

Laboratory Standards

Gain an understanding of different types of hazards, and how to protect health and safety. Receive information on chemicals and Material Safety Data Sheets (MSDS).

Go to page 39 for more details.

Hazard Communication and Bloodborne Pathogens

Receive the information that is necessary for you to train and inform employees properly on OSHA standards. Learn to design and implement employee protection programs. Review and discuss the OSH Act, including citation and penalties and how to avoid them. Learn how to become recognized by the U.S. Department of Labor as having been trained by an OSHA-authorized trainer.

Agenda Topics:

- The regulatory basis
- Epidemiology and symptoms
- Transmission modes
- Engineering controls and safe work practices
- Personal protective equipment and decontamination
- Review of the standard, and who is covered
- Definition of bloodborne pathogens, the different diseases and the symptoms of each disease
- Demonstration of a decon kit
- Student participation in a decon exercise
- The requirements of the medical program, availability and declination of vaccinations

Hazardous Waste Operations and Emergency Response

This course satisfies the requirements of OSHA 29 CFR 1910.120 for the training of personnel who respond to emergency releases of hazardous materials. Learn how to respond safely to an emergency, identify the materials released, and control the spill until further response is necessary.

Agenda Topics:

- Overview of regulations
- Basic characteristics and properties of hazardous materials
- Personal protective equipment (including hands-on)
- Identification of hazardous materials
- Size-up strategy and tactics
- Table-top exercise
- Size-up strategy and tactics
- Initial site control and reconnaissance
- Incident control: confinement, containment and cleanup
- Decontamination
- Dress-out exercise
- Overview of regulations
- Properties and characteristics of hazardous materials
- Identification of hazardous materials
- Toxicology and industrial hygiene
- Monitoring and instrumentation
- Personal protective equipment
- Emergency response plans
- Site control
- Decontamination
- Spill containment and cleanup
- Fire safety
- Confined space entry

Related Courses

OSHA Safety Training

Receive the information that is necessary for you to train and inform employees properly on OSHA standards. Design and implement employee protection programs. Review and discuss the OSH Act, including citation and penalties and how to avoid them.
Go to page 36 for more details.

Fall Protection

This course satisfies the requirements of OSHA 29 CFR 1926.502 and 1910.66 for the training of all persons who climb or work on elevated surfaces where the risk of a fall is present.
Go to page 37 for more details.

Confined Space Entry

This comprehensive one-day lecture course will benefit anyone who has identified permit-required spaces and must develop a written program for identifying and evaluating hazards, preventing unauthorized entry and establishing safe entry procedure.
Go to page 36 for more details.

DOT Hazardous Materials

This course meets the requirement of the EPA for the initial and/or retraining of all personnel involved in hazardous waste management. This includes anyone who reads and interprets RCRA regulation, develops facility procedures, and trains other employees.

Laboratory Standards

This course meets the training requirements of 29 CFR 1910.1450, for personnel working in a laboratory who are potentially exposed to hazardous materials. Gain an understanding of different types of hazards, and how to protect health and safety. Receive information on chemicals and Material Safety Data Sheets (MSDS).

Agenda Topics:

- Chemical hygiene plan
- Physical and health hazards
- Engineering controls
- Safe work procedures
- Personal protective equipment
- Labels and labeling requirements
- Material safety data sheets
- Emergency procedures

Related Courses

OSHA Safety Training

Receive the information that is necessary for you to train and inform employees properly on OSHA standards. Design and implement employee protection programs. Review and discuss the OSH Act, including citation and penalties and how to avoid them.
Go to page 36 for more details.

NICET® I and II

This class is helpful to personnel working in the fire alarm industry who engage in a combination of fire alarm system activities including layout, equipment selection, installation, acceptance testing, troubleshooting and servicing.
Go to page 34 for more details.

Lockout/Tagout Requirements and Procedures

Review methods used to protect employees from injury due to the release of hazardous levels of energy and take an in-depth look at the regulatory standard addressing Lockout/Tagout.
Go to page 35 for more details.

Natural Gas Safety

Learn the general safety practices in both outside distribution systems and inside equipment piping. It will help you understand the codes and standards as applied to natural gas usage in commercial and industrial facilities. Learn about leak testing, materials of construction, attachment methods, lockout/tagout and blanking requirements, corrosion control as well as venting requirements in this thorough and comprehensive course.

Agenda Topics:

- Usage of natural gas
- General Safety Practices
- Physical Properties of Natural Gas
- Materials of Construction
- Cathodic Protection From Corrosion
- Maintenance
- Indoor and Outdoor Instruction

Maintenance Manager

A well run maintenance organization can have a positive impact on company profits. Take the opportunity to learn how to build a comprehensive maintenance program for your team. Learn how to develop a step-by-step plan to take your maintenance group to the next level of operation. Discover how to get the most return from preventive maintenance and its investment. Gain techniques to effectively plan the maintenance process and work. Learn to identify and minimize wasted time.

Agenda Topics:

- Transition maintenance from reactive to proactive mode
- Reduce equipment downtime, output (OEE) and reliability
- Reduce injury and scrap rates
- Reduce maintenance and energy costs
- Improve OSHA compliance
- Create your maintenance vision
- Identify and discuss your critical pieces of equipment
- Maintenance mapping: locate waste in your current maintenance process
- Create zero equipment stoppages and failure
- The four phases of approaching zero stoppages
- Overall equipment effectiveness: case studies
- How to develop lubrication excellence and evaluate your lubrication strategy
- Developing condition-based preventive maintenance
- PM optimization and predictive maintenance
- Planning and scheduling
- Barriers to world class maintenance
- Measurements
- Develop a plan going forward

Related Courses

2014 NEC®

The National Electrical Code® is used by all states for industry-wide electrical standards. Ensure your organization is in compliance. This course benefits individuals who are either at an introductory level or who are experienced in working with electrical systems significantly increase their knowledge, skill level and confidence.
Go to page 12 for more details.

NFPA 101 Life Safety Code

Learn and/or review the requirements that influence the safety of people and protection of property and equipment.
Go to page 37 for more details.

2012 NFPA 79: Electrical Standards for Industrial Machinery

Get an overview of scope of the NPFA 79. Learn how to effectively use the Standard as a guideline for wiring, sizing conductors and overcurrent protection for industrial machines operating from a nominal voltage of 600 volts or less.
Go to page 9 for more details.

LICENSING BOARD INFORMATION

The following Licensing Boards accept NTT training as continued education for license renewal. Please call 800.922.2820 for specific class approvals.

Alabama
AL Board for Pro Engineers & Land Surveyors
License Type: Pro Engineers
Board for Heating & Air Conditioning Contractors
License Type: HVAC

Alaska
AK State Board of Reg. for Architects, Engineers & Land Surveyors
License Type: Pro Engineers
Division of Occupational License (DOL)
License Type: Electrical
Division of Water Operator Training & Certification Program
License Type: Water & Wastewater

California
California Water Environment Association (CWEA)
License Type: Wastewater
Sacramento Office of Education
License Type: Electric
Calif Dept. of Education
License Type: Electric

Colorado
Dept. of Regulatory Agencies (DORA)
License Type: Electric
Colorado Dept. of Health and Environment
Colorado Water and Wastewater Facility Operators Certification Board
License Type: Wastewater and Plumbers

Delaware
Delaware Board of Electrical Examiners
License Type: Electrical

Florida
Dept. of Business & Pro Regulation (DBPR)
License Type: Electrical
Miami Dade County
License Type: Electrical
FL Water & Pollution Control Operators Association
License Type: Water & Wastewater
Florida Board of Pro Engineers (FBPE)
License Type: Pro Engineers

Georgia
Construction Industries License Board (CILB)
License Type: Electrical
GA Board of Pro Engineers & Land Surveyors
License Type: Pro Engineers
Secretary of State Georgia
License Type: Plumbing
Professional Licensing Board Division
License Type: HVAC

Idaho
Department of Building Safety Electrical Bureau (DBS)
License Type: Electrical
State of Idaho Licensure of Professional Engineers and Professional Land Surveyors
License Type: Pro Engineers

Illinois
IL Department of Financial & Pro Regulation
License Type: Pro Engineers
Illinois Environmental Protection Agency (EPA)
License Type: Drinking Water Operator

Indiana
Indiana Department of Environmental Management (IDEM)
License Type: Water and Wastewater
State Board of Registration for Professional Engineers
License Type: Pro Engineers

Iowa
Professional Licensing Bureau for Engineers & Land Surveyors
License Type: Electrical & Pro Engineers

Kansas
KS State Board of Technical Professions
License Type: Pro Engineers

Kentucky
Dept. for Environmental Protection (DEP)
License Type: Water & Wastewater
Office of Housing, Buildings & Construction (OHBC)
License Type: Electrical

Louisiana
LA State License Board for Contractors
License Type: Contractors
Pro Engineering & Land Surveying Board
License Type: Pro Engineers
Lousiana Professional Engineering and Land Surveying Board
License Type: Pro Engineers

Maine
Board of Regulatory for Pro Engineers
License Type: Pro Engineers
Office of License & Reg, Electricians' Exam Board (OLR)
License Type: Electrical

Maryland
Board of Water Works & Waste Systems Operators
License Type: Water & Wastewater
Cecil County Electrical Board (CCEB)
License Type: Electrical

Massachusetts
Bureau of Certification of Operators (BCO)
License Type: Water
Department of Environmental Protection (DEP)
License Type: Wastewater

Michigan
Bureau of Construction Codes, Electrical Division (BCC)
License Type: Electrical
Michigan Department of Environmental Quality (MDEQ)
License Type: Water & Wastewater

Minnesota
Board of Engineering
License Type: Pro Engineers
Department of Labor & Industries (DL&I)
License Type: Electrical

Mississippi
Mississippi Board of Professional Engineers
License Type: Pro Engineers

Missouri
Department of Natural Resources (DNR)
License Type: Water & Wastewater
MO Board for Architects, Pro Engineers & Land Surveyors (MOAPELS)
License Type: Pro Engineers

Montana
Montana State Electrical Board
License Type: Electrical
MT Department of Labor & Industry—Business Standards
License Type: Pro Engineers

Nebraska
Board of Engineers & Architects
License Type: Pro Engineers
Nebraska State Electrical Board
License Type: Electrical

Nevada
Board of Pro Engineers & Land Surveyors
License Type: Pro Engineers
Division of Environmental Protection (DEP)
License Type: Drinking Water Operator

LICENSING BOARD INFORMATION (continued)

The following Licensing Boards accept NTT training as continued education for license renewal. Please call 800.922.2820 for specific class approvals.

New Hampshire
NH Joint Board of License & Certification
License Type: Pro Engineers

New Jersey
Board of Examiners of Electrical Contractors (BEEC)
License Type: Electrical
State Board of Professional Engineers and Land Surveyors
License Type: Pro Engineers

New Mexico
Environment Department
License Type: Water & Wastewater
NM State Board of License for Pro Engineers & Pro Surveyors
License Type: Pro Engineers
Regulation & Lic Dept., Construction Industries Division (CID)
License Type: Electrical

New York
Department of Environmental Conservation (NYSDEC)
License Type: Wastewater Treatment Plant Operators
State Education Department
License Type: Pro Engineers

North Carolina
Board of Examiners for Engineers & Land Surveyors (BEES)
License Type: Pro Engineers
Board of Examiners of Electrical Contractors (BEES)
License Type: Electrical

North Dakota
North Dakota Board of Registration for Professional Engineers and Land Surveyors
License Type: Pro Engineers

Ohio
Board of Reg. for Pro Engineers and Surveyors (PEPS)
License Type: Pro Engineers
Ohio Construction Industry License Board (OCILB)
License Type: Electrical and Contractors
Ohio Environmental Protection Agency (OEPA)
License Type: Water & Wastewater

Oklahoma
Construction Industries Board **(CIB)**
License Type: Electrical
Oklahoma Pro Engineers and Land Surveyors **(PELS)**
License Type: Pro Engineers
Oklahoma State Board for Professional Engineers and Land Surveyors
License Type: Pro Engineers

Oregon
Board of Examiners for Engineers & Land Surveyors (BEELS)
License Type: Electrical
Building Codes Division
License Type: Pro Engineers
Oregon Board of Examiners for Engineering and Land Surveyors
License Type: Pro Engineers

Pennsylvania
Department of Environmental Protection (DEP)
License Type: Water & Wastewater
Uniform Construction Code (UCC)
License Type: Electrical
Pennsylvania State Registration Board of Professional Engineers, Surveyors and Geologists
License Type: Pro Engineers

South Carolina
South Carolina State Board of Regulation for Professional Engineers
License Type: Pro Engineers

South Dakota
South Dakota Board of Technical Professions
License Type: Pro Engineers

Tennessee
Board for Architectural & Engineering Examiners
License Type: Pro Engineers

Texas
Texas Board for Pro Engineers (TBPE)
License Type: Pro Engineers
Texas Department of License & Regulation (TDLR)
License Type: Electrical
Texas Commission of Environmental Quality - Water and Wastewater
License Type: Water & Wastewater

Utah
Department of Occupational & Pro License (DOPL)
License Type: Electrical
Utah Division of Occupational and Professional Licensing
Board of Professional Engineers
License Type: Pro Engineers

Virginia
Department of Pro & Occupational Regulations (DPOR)
License Type: Electrical, Pro Engineers, Water & Wastewater

Washington
Dept. of Ecology, Wastewater Certification Program
License Type: Wastewater Treatment Plant Operators
Washington Department of Labor & Industries (L&I)
License Type: Electrical, Plumbing
Washington Environmental Training Center (WETRC)
License Type: Drinking Water Operator

West Virginia
Board of Reg. for Pro Engineers (BRPE)
License Type: Pro Engineers

Wisconsin
Department of Natural Resources (DNR)
License Type: Water & Wastewater
Safety & Buildings Division
License Type: Electrical and Plumbing
Wisconsin Department of Safety - Electrical, Plumbing and HVAC
License Type: HVAC and Plumbing
Wisconsin Society of Professional Engineers
License Type: Pro Engineers

Wyoming
Board of Reg. for Pro Engineers and Pro Land Surveyors
License Type: Pro Engineers
Wyoming Fire Marshal
License Type: Electrical
Wyoming Department of Environmental Quality
License Type: Wastewater

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Courses with Skill Circuit provide the added benefit to help tailor your seminar before it starts then anchoring the trainings so people can retain and recall it.

Trades Learning Paths

Electrical Trades Learning Path

- NFPA 70E Arc Flash Electrical Safety with Practical Demonstration
- 1910.269 High Voltage Electrical Safety
- Electrical Systems in Hazardous Locations
- Basics of Industrial Electricity
- Troubleshooting Electrical Control Circuits
- Electrical Print Reading

"The Fundamentals"

Skill Development Step 1

- National Electric Code ® NEC
- Grounding and Bonding
- Substation Maintenance Safety
- Variable Frequency Drives
- Programmable Logic Controllers
- Understanding & Troubleshooting Electrical Motors

- Fiber Optic Installation and Maintenance
- Instrumentation Process Control
- Tuning DDC / Process Control Loops
- Industrial Electronics

Skill Development Step 2

HVAC Trades Learning Path

- NFPA 70E (Electrical Safety)
- Air Conditioning & Refrigeration
- Heating Ventilation and Industrial Electricity
- Troubleshooting Electrical Control Circuits
- Understanding and Troubleshooting Electric Motors

"The Fundamentals"

Skill Development Step 1

- Chilled Water Systems
- Boilers
- Pneumatic Comfort Controls
- Centrifugal Pumps
- Variable Frequency Drives
- Programmable Logic Controls

- Tuning DDC / Process Control Loops
- Brazing
- Instrumentation Process Control
- Advanced Air Conditioning & Refrigeration
- Air & Water Balancing

Skill Development Step 2

Mechanical Trades Learning Path

- NFPA 70E Arc Flash Electrical Safety
- Troubleshooting Electrical Control Circuits
- Understanding & Troubleshooting Electrical Motors
- Mechanical Drives / Power Transmissions
- Bearings and Lubrication
- Shaft Alignment

"The Fundamentals"

Skill Development Step 1

- Welding Principles and Procedures
- Conveyors
- Hydraulics Training and System Troubleshooting
- Pneumatics Systems and Principles
- Electro – Pneumatics Training

- Instrumentation Process Control
- Vibration Analysis
- Ball Screw Applications & Techniques
- Machine Tool Alignment

Skill Development Step 2

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NTT Training Programs

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- National Electrical Code®
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- HVAC
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