2020 Customer Training Catalog

Training options to meet your needs.
# Course Details and Information

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About the Johnson Controls Training Institute

Since 1947, the Johnson Controls Training Institute has been helping people succeed at creating and managing quality building environments. The Training Institute partners with engineering schools, technical colleges, and experts in the building environments industry. This allows us to provide high-quality learning experiences that reflect both the current state of the industry today and the direction its heading in the future.

Our curriculum has been developed by professional instructors who are experienced in the building environments industry. Their extensive real-world experience and ability to share their knowledge in a structured format assures you an enlightening and productive educational experience.

- Learn from Certified Instructors* with years of industry experience
- Experiment in our labs, using specially designed equipment simulators
- Find the learning opportunities
- Expand your knowledge in industry topics such as:
  - Building Automation Systems
  - Energy Management
  - Heating, Ventilating, and Air Conditioning Systems
  - Preventative Maintenance
  - Automated Building Controls

Because your goal is to apply what you’ve learned, our state-of-the-art facilities include fully equipped labs for hands-on exercises. Portable equipment simulators enable the Training Institute to bring many of its courses to your location, yet still enable you to practice what you’ve learned without jeopardizing building operations.

Our comprehensive and cost-effective programs are designed for anyone who needs a working knowledge of environmental systems, including:
- Building Owners
- Building Managers
- Engineers
- Operators
- Maintenance Technicians
- Property Managers

*Johnson Controls Training Institute instructors are certified on the technical and application objectives of each course, while referencing the core instructor competencies summarized by the International Board of Standards for Training, Performance, and Instruction (IBSTPI) Instructor Competencies – The Standards (Volume 1) ©2003, all rights reserved.
Our learning opportunities are designed to provide you with the knowledge and skills necessary to effectively and efficiently operate your building's systems. By using your newly acquired abilities, you can maximize the potential of your building systems and increase your return on investment. To help you take advantage of the benefits of our training, we offer several ways to approach our courses. You can select from our:

Training Institute Courses (Scheduled)
Regularly scheduled courses with both a classroom and lab component are conducted at our ten Johnson Controls Training Institute locations. During class you will be using an iPad® to take notes and highlight the material. When class ends you will take your notes and course material with you on a USB Drive. The descriptions of the regularly scheduled courses begin on page 13. Refer to the Class Schedule available at www.johnsoncontrols.com/institute for the dates, locations, and prices of these courses. Note: No audio/visual recording equipment is allowed.

Instructor-Led Distance Learning Courses and Learning Packages
Learn in the convenience of your own home, office, or work location using Johnson Controls instructor-led distance learning courses or learning packages. Learning packages include self-study workbooks offering flexible, effective, cost-efficient opportunities to build knowledge and skills. Our instructor-led distance learning courses and learning packages can be used as preparation for a course, to refresh skills, or to provide an effective learning alternative if attendance at a typical classroom course is impractical. The list of instructor-led distance learning courses and learning packages begins on page 29 and information about our learning packages begins on page 36.

Courses Offered By Request Only
Some of our courses target a more specific audience and therefore, have lower demand. To continue to satisfy the needs of those who still occasionally need these courses, selected courses are only conducted upon request. These courses can be conducted at your site or at one of our eleven Training Institute locations. For this reason, these courses are not included on the schedule. To inquiry about scheduling a course, contact the Learning Institute at 414-524-4286 or cg-customer.registrar@jci.com.

Onsite Learning Programs
Johnson Controls Training Institute can help you make the most of your investment in learning by bringing our instructors and classes to you or to the location of your choice. More and more companies are realizing the value of bringing training Onsite. Our onsite Courses can be the most efficient and cost-effective way to train as few as eight employees.

Onsite Courses offer a number of advantages:
• Smaller class size allows for more individualized attention
• Economical as one instructor travels instead of eight or more students
• Consistency among employees who learn together as a group

To ensure the success of an onsite Course, you provide:
• A minimum of eight students
• A suitable room for training

Johnson Controls Training Institute will provide:
• Specially designed portable equipment simulators and computers
• USB jump drives with course and reference material for all student
To browse our catalog and enroll for our courses, please visit our website: www.jcitraininginstitute.com

For more information, call or fax: 414-524-4286 or 800-524-8540
877-403-6625 (fax)
Email: cg-customer.registrar@jci.com

Payment:
Payment can be made using Visa®, MasterCard®, or American Express®.
All necessary course materials are included in the tuition listed in each course description.

Schedule of Classes
The 2020 schedule of classes is available at www.johnsoncontrols.com/institute. The schedule is subject to change.

Vouchers
Enjoy savings and flexibility by ordering a pack of vouchers good for any classes without enrolling specific students at this time. For ordering information, call 800-524-8540.
(Vouchers cannot be used for course #4720 Facility Explorer Supervisory Controllers Engineering/N4 Certification.
• A 10-pack of training vouchers is $19,000. Vouchers are good for two years from the date of purchase and must be used for regularly scheduled Training Institute classes.
• A 5-pack of training vouchers is $11,000. Vouchers are good for one year from the date of purchase and must be used for regularly scheduled Training Institute classes.
• The Personal 3-Pack is valid for a specified individual for any three classes and is good for one year from the date of purchase. The Personal 3-Pack is $6,600.

Substitutions and Cancellations
Circumstances may occur that could prevent you or your employee from attending a course for which you are enrolled. For this reason, we allow you to substitute another employee in their place at no additional fee. If no substitute student is available and you must cancel your enrollment, a refund will be issued by visiting www.jcitraininginstitute.com at least 10 business days prior to the start of the course. If, however, you must cancel within 10 business days of the start of the course, you will be liable for the entire course fee.

Johnson Controls reserves the right to cancel classes and assumes no liability for expenses. All registrants will be notified at least ten days before the start of class should a course be canceled.

Guarantee
We stand behind our courses with the following guarantee: If, by the midpoint of the course, you are not satisfied with the course you are taking, Johnson Controls Training Institute will refund your tuition fee in full, or give you credit toward another course or packaged training program.
Students must call the hotels directly to make reservations. The Johnson Controls Training Institute rate must be requested. Be sure to ask about complimentary shuttle services to and from our learning centers. (These services are not available everywhere). Reservations made through a travel agency are not eligible for the discounted rate. Look for maps of the Training Institutes on the Johnson Controls website: www.johnsoncontrols.com/institute

**Baltimore, Maryland**

60 Loveton Circle, Sparks, MD 21152
Located in rural Baltimore County off of I-83 North, approximately 35 miles from Baltimore Washington International Airport. Airport Code: BWI

**Suggested Hotels**

**Embassy Suites**
213 International Circle
Hunt Valley, MD 21030

**Holiday Inn Express Hunt Valley**
11200 York Road
Hunt Valley, MD 21030
410-527-1500

**Residence Inn - Hunt Valley**
45 Schilling Rd
Hunt Valley, MD 21031
410-527-2333

**Greater Baltimore Convention and Visitor Bureau**
www.baltimore.org
1-877-Baltimore

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**Boston, Massachusetts**

39 Salem Street, Lynnfield, MA 01940
Located approximately 12 miles from Boston’s Logan International Airport. Airport Code: BOS

**Suggested Hotels**

**Four Points by Sheraton Wakefield Boston Hotel and Conference Center**
1 Audubon Road
Wakefield, MA 01880
781-245-9300

**Hampton Inn**
59 Newberry Street (Route1)
Peabody, Ma 01960
978-536-2020

**SpringHill Suites by Marriott**
43 Newberry Street (Route 1)
Peabody, Ma 01960
978-535-5000

**Greater Boston Convention and Visitor’s Bureau**
www.bostonusa.com

**The City Guide Salem, MA**
www.salemweb.com
Students must call the hotels directly to make reservations. The Johnson Controls Training Institute rate must be requested. Be sure to ask about complimentary shuttle services to and from our learning centers. (These services are not available everywhere). Reservations made through a travel agency are not eligible for the discounted rate. Look for maps of the Training Institutes on the Johnson Controls website: www.johnsoncontrols.com/institute

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**Suggested Hotels**

**Element**
3550 W. IH 635
Irving, TX 75063
972-929-9800

**Staybridge Suites - DFW Airport North**
2220 Market Place Blvd
Irving TX 75063
972-401-4700

**Hyatt House Dallas/Las Colinas**
5901 N MacArthur Blvd
Irving TX 75039
972-831-0909

**Hilton Garden Inn Las Colinas**
7516 Las Colinas Blvd
Irving TX 75063
972-444-8434

**Staybridge Suites - DFW Airport North**
2220 Market Place Blvd
Irving TX 75063
972-401-4700

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**Greater Dallas Convention and Visitor Bureau**
www.dallascvb.com
214-571-1000

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**Suggested Hotels**

**Candlewood Suites Houston – Pasadena**
3450 East Sam Houston Pkwy S,
Pasadena, TX 77505
713-920-9927

**Best Western Deer Park Inn & Suites**
1401 Center St,
Deer Park, TX 77536
281-476-1900

**Comfort Suites Deer Park Pasadena**
1501 Center St,
Deer Park, TX 77536
281-930-8888

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**Dallas, Texas**
3021 West Bend Drive, Irving, TX 75063
Located 6 minutes from the Dallas Fort Worth International Airport.
Airport Code: DFW

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**Houston, Texas,**
10644 West Little York Road,
Houston, TX 77041
Located approximately 22 miles from the George Bush Intercontinental Airport and 27 miles from Houston/Hobby Airport.
Airport Codes: IAH and HOU
TRAINING INSTITUTE LOCATIONS AND HOTELS

Students must call the hotels directly to make reservations. The Johnson Controls Training Institute rate must be requested. Be sure to ask about complimentary shuttle services to and from our learning centers. (These services are not available everywhere). Reservations made through a travel agency are not eligible for the discounted rate. Look for maps of the Training Institutes on the Johnson Controls website: www.johnsoncontrols.com/institute

Indianapolis, Indiana
1255 North Senate Avenue,
Indianapolis, IN 46202
Located approximately 15 minutes from the Indianapolis International Airport.
Airport Codes: IND

Suggested Hotels
Courtyard Marriott Indianapolis at the Capital
320 North Senate Ave
Indianapolis, IN 46204
317-684-7733

Hampton Inn Indianapolis Downtown
105 S Meridian St
Indianapolis, IN 46225
317-261-1200

Residence Inn Marriott Canal
350 West New York Street
Indianapolis, IN 46202
317-822-0840

Greater Indianapolis Convention and Visitor Bureau
www.visitindy.com

Louisville, Kentucky
9410 Bunsen Parkway, Suite 100,
Louisville, KY 40220
Located approximately 10 miles from Louisville International Airport.
Airport Codes: SDF

Suggested Hotels
Holiday Inn Louisville East – Hurstbourne
1325 South Hurstbourne Parkway
Louisville, KY 40220
502-426-2600

Hyatt Place – East
701 South Hurstbourne Parkway
Louisville, KY 40222
502-426-0119

Greater Louisville Convention and Visitor’s Bureau
www.gotolouisville.com
Students must call the hotels directly to make reservations. The Johnson Controls Training Institute rate must be requested. Be sure to ask about complimentary shuttle services to and from our learning centers. (These services are not available everywhere). Reservations made through a travel agency are not eligible for the discounted rate. Look for maps of the Training Institutes on the Johnson Controls website: www.johnsoncontrols.com/institute

**Milwaukee, Wisconsin**

514 N. Jefferson Street,
Milwaukee, WI 53202
Located in downtown Milwaukee,
approximately 10 miles from
General Mitchell International Airport.
Airport Codes: MKE

**Suggested Hotels**

**Courtyard Marriott**
300 West Michigan Street
Milwaukee, WI 53203
414-291-4122 / 888-811-8139

**Hilton Garden Inn Milwaukee Downtown**
611 N Broadway
Milwaukee, WI 53202
414-271-6611

**Hilton – Milwaukee City Center**
509 West Wisconsin Avenue
Milwaukee, WI 53203
414-271-7250 / 800-445-8667

**Hotel InterContinental**
139 East Kilbourn Avenue
Milwaukee, WI 53202
414-276-8686

**Pfister Hotel**
424 East Wisconsin Avenue
Milwaukee, WI 53202
414-273-8222 / 800-558-8222

**Residence Inn Marriott**
648 N. Plankinton Avenue
Milwaukee, WI 53203
414-224-7890

**Greater Milwaukee Convention and Visitor Bureau**
www.milwaukee.org
414-273-3950 / 800-554-1448

**Phoenix, Arizona**

Gateway Community College,
108 N. 40th Street, Phoenix, AZ 85034
Located about one mile north of the
Phoenix Sky Harbor International Airport.
Airport Codes: PHX

**Suggested Hotels**

**Crowne Plaza Phoenix**
4300 East Washington Street
Phoenix, AZ 85034
602-273-7778

**Hampton Inn**
601 North 44th Street
Phoenix, AZ 85008
602-267-0606

**Hilton Garden Inn**
3838 East Van Buren Street
Phoenix, AZ 85008
602-306-2323

**Greater Phoenix Convention and Visitor’s Bureau**
www.arizonaguide.com
Students must call the hotels directly to make reservations. The Johnson Controls Training Institute rate must be requested. Be sure to ask about complimentary shuttle services to and from our learning centers. (These services are not available everywhere). Reservations made through a travel agency are not eligible for the discounted rate. Look for maps of the Training Institutes on the Johnson Controls website: [www.johnsoncontrols.com/institute](http://www.johnsoncontrols.com/institute)

### Suggested Hotels

**Ayres Hotel**  
12850 Seal Beach Boulevard  
Seal Beach, CA 90740  
800-653-3230

**Courtyard Marriott**  
5865 Katella Avenue  
Cypress, CA 90630  
714-827-1010

**Hyatt House**  
5905 Corporate Avenue  
Cypress, CA 90630  
714-828-4000

**Marriott Residence Inn**  
4931 Katella Avenue  
Los Alamitos, CA 90720  
714-484-5700

**Greater Los Angles Convention and Visitor Bureau**  
[www.latourist.com](http://www.latourist.com)  
213-689-8822

**Orange County Visitor Information**  
[www.visittheoc.com](http://www.visittheoc.com)  
877-GO-ORANGE

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### Southern California

5770 Warland Drive, Cypress, CA 90630  
Located approximately 9 miles from the Long Beach Airport, 20 miles from the John Wayne Airport, and 30 miles from the Los Angeles International Airport.  
Airport Codes: SNA & LAX

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### Tampa, Florida

3802 Sugar Palm Dr, Tampa FL 33619  
Located 12 miles from the Tampa International Airport.  
Airport Codes: TPA

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**Suggested Hotels**

**Hilton Garden Inn Tampa East/Brandon**  
10309 Highland Manor Drive  
Tampa, FL 33610  
813-626-6700

**Residence Inn Tampa Sabal Park/Brandon**  
9719 Princess Palm Avenue  
Tampa, FL 33619  
813-627-8855

**Staybridge Suites Tampa East Brandon**  
3624 North Falkenburg  
Tampa, FL 33619  
813-227-4004

**Fairfield by Marriott**  
6720 Lakeview Center Drive  
Tampa, FL 33619  
(813) 626-3000

**Holiday Inn Express & Suites**  
8610 Elm Fair Blvd  
Tampa, FL 33610  
(813) 490-1000

**Greater Tampa Convention and Visitor’s Bureau**  
[www.visittampabay.com](http://www.visittampabay.com)
Students must call the hotels directly to make reservations. The Johnson Controls Training Institute rate must be requested. Be sure to ask about complimentary shuttle services to and from our learning centers. (These services are not available everywhere). Reservations made through a travel agency are not eligible for the discounted rate. Look for maps of the Training Institutes on the Johnson Controls website: [www.johnsoncontrols.com/institute](http://www.johnsoncontrols.com/institute)

**Suggested Hotels**

**Home2 Suites by Hilton York**
212 Pauline Drive
York, PA 17402
717-747-0360

**Shrewsbury Hampton by Hilton**
1000 Far Hills Drive
New Freedom, PA 17349
717-235-9898

**Holiday Inn Express & Suites York**
140 Leader Heights Road
York PA 17403
717-741-1000

**Hampton Inn & Suites Hilton York South**
2159 South Queen Street
York PA 17402
717-741-0900

**Greater Shrewsbury Convention and Visitor’s Bureau**
[www.shrewsburyguide.info](http://www.shrewsburyguide.info)

**New Freedom, PA**
5000 Renaissance Drive
New Freedom, PA 17349
Located 52 miles from the Baltimore Washington International Airport and 47 miles from the Harrisburg International Airport.

Airport Codes: BWI & MDT
TYPICAL SEQUENCE OF HVAC INDUSTRY COURSES

Focus on Mechanical

- HVAC Equipment Maintenance (#225)
- HVAC Pneumatic Controls – Multi-Manufacturer (#221)
- YVAA Air Cooled Screw Chiller (#2111)
- YVWA Water Cooled Screw Chiller (#2112) (By request only)
- YLAA Chiller Start-Up & Troubleshooting (#2114)
- Series II VFD Commissioning Training – JCI/Eaton (#233) (By request only)

Focus on Controls

- HVAC Mechanical Systems (#210)
- Fundamental Control Strategies for HVAC Systems (#215)
- Contractor Course
- YT/YK Centrifugal Chiller and Compressor Overhaul (#2107)
- YK High Pressure Centrifugal Operations/Maintenance (#2102)
- YCAV Air Cooled Rotary Screw Liquid Chillers (#2103)
- OptiView Control Panel (#2100)
- YPAL Series 100 Packaged RTU (#2108)
- Absorber Operations/Maintenance (#2104)
HVAC Mechanical Systems
Course #210, 3.0 CEU

The fundamentals of HVAC mechanical equipment operation are taught in this survey, hands-on course. Designed for personnel responsible for the selection, design, installation, calibration or maintenance of HVAC mechanical equipment. It emphasizes hands-on activities with boilers, chillers, air handlers and other operating equipment from a variety of manufacturers. Students will gain a comprehensive understanding of operating principles and the proper use of test instruments to verify equipment performance.

Course Topics
- HVAC System Types and Piping Systems
- Psychrometrics
- Air Handlers, Types and Characteristics
- Fans and Fan Characteristics
- Dampers and Damper Actuators
- Valves and Valve Actuators
- Facility Management Systems
- Controls and Components
- Boilers and Boiler-Related Equipment
- Heat Exchangers and Pumps
- Refrigeration Fundamentals
- Reciprocating Chillers and Accessories
- Centrifugal Chillers
- General Troubleshooting
- Hands on Lab
- Final Review

Course Duration
Monday–Friday
Class ends at 11:30 a.m. on Friday
Course Fee
$2300 per student

ENROLL NOW

Fundamental Control Strategies for HVAC Systems
Course #215, 3.0 CEU

This introductory course is designed for anyone who operates, maintains or troubleshoots HVAC control systems. Students will analyze a number of HVAC Systems and their associated controls, including central plant, air and water distribution and terminal systems. The strategies learned can be applied to any controls system type or manufacturer.

Course Topics
- HVAC Environment, Systems and Controls
- Psychrometrics, Air Properties and HVAC Processes
- Control System Fundamentals
- Sensor Types and Applications
- Controls System Configurations
- Feedforward and Feedback Control Loops
- Reset Control Strategies
- Controlled Devices: Valves, Dampers, and Actuators
- Hot/Chilled Water Distribution Systems
- Control Strategies for Water Distribution Systems
- Hot/Chilled Water Terminal Systems
- Control Strategies for Water Terminal Systems
- Air Distribution Systems
- Control Strategies for Air Distribution Systems
- 100% OA System Control Strategies
- Mixed Air System Control Strategies
- Variable Air Volume Control Strategies
- VAV Terminal Unit Control Strategies
- Introduction to Facility Management Systems
- Hands on Lab
- Final Review

Course Duration
Monday–Friday
Class ends at 11:30 a.m. on Friday
Course Fee
$2300 per student

ENROLL NOW
HVAC Equipment Maintenance
Course #225, 2.0 CEU

This introductory course provides an overview of the maintenance tasks and techniques that are typically required on HVAC equipment. Individuals new to HVAC maintenance, managing a maintenance function or desiring a refresher will benefit. Students will learn how to perform proper maintenance, safety procedures and basic troubleshooting techniques.

Course Topics
- Overview of HVAC
- Electrical Systems
- OSHA Lockout/Tagout Training
- Refrigeration Maintenance and Troubleshooting
- Centrifugal Systems Overview
- Pump Maintenance
- Cooling Towers
- Air Handling Systems
- Boilers
- Air Compressor Maintenance
- Hands on Lab
- Final Review

Course Duration
Tuesday-Thursday
Class ends at 3:30 p.m. on Thursday

Course Fee
$1800 per student

HVAC Pneumatic Controls - Multi Manufacturer
Course #221, 2.0 CEU

This course provides a comprehensive overview of maintenance requirements, calibration procedures and troubleshooting techniques. Hands-on lab exercises emphasize calibrating and troubleshooting using pneumatic controls from a variety of manufacturers.

Recommended Prerequisite:
Fundamental Control Strategies for HVAC Systems (#215) or HVAC Mechanical Systems (#210) or equivalent experience

Course Topics
- Pneumatic Air Supply and Distribution Systems
- Room Control – Thermostats and Humidistats
- Relation of Controller and Controlled Device
- Single Setpoint Room Controllers, Thermostats and Humidistats
- Dual Setpoint Room Controllers
- Pneumatic Controlled Devices: Valves, Dampers,  Actuators, Pilot, Positioners
- Auxiliary Devices
- Pneumatic Transmitters (Remote Sensing)
- Single Input Receiver Controllers
- Dual Input Receiver Controllers

Course Duration
Tuesday-Thursday
Class ends at 3:30 p.m. on Thursday

Course Fee
$1800 per student

ENROLL NOW
## OptiView Control Panel
Course #2100, 1.3 CEU

This two-day course for service personnel covers the OptiView graphic micro-processor control center. Basic navigation, panel architecture, operation and service of the OptiView Control Centers are covered in this course. Labs include hands-on training using OptiView Control Panel simulators.

### Course Topics
- OptiView Basics
- OptiView Architecture: Component Identification, Location and Functionality
- OptiView Operation: Screen Navigation, Program Download, Codes, Configuration Setup, System Commissioning Checklist
- System Calibration, Service Setpoints and Reset Procedures
- Electro-Mechanical Starter Board
- Solid State Starter Board
- Variable Speed Drive Board
- High Speed Thrust Bearing Limit Switch
- Proximity Probe, Refrigerant Level Control
- Sale Order Data, Custom User ID and Password, Record Setpoint Changes
- High Condenser Pressure Warning Threshold
- Smart Freeze Protection
- Diagnostics and Troubleshooting
- Advanced Diagnostics, Trend Screen Setup
- Hands on Lab

### Course Duration
Tuesday–Wednesday
Class ends at 3:30 p.m. on Wednesday

### Course Fee
$1400 per student

### YK High Pressure Centrifugal Operations/Maintenance
Course #2102, 2.0 CEU

Students will learn about the internal workings of the YK high-pressure centrifugal single-stage compressor, oil return system, OptiView Control Center and other components and subsystems. A comprehensive review of the preventive maintenance schedule and system capacity checkout procedure is also covered.

### Course Topics
- Centrifugal Compressor Theory of Operation
- YK Chiller Design and Component Functionality
- YK Seasonal Start-up
- OptiView Basics: Application, Terminology
- OptiView Architecture: Component Identification, Component Location
- OptiView Operation: Screen Navigation, Interpretation, and Modification
- Maintenance
- Troubleshooting
- Warranty
- OptiView Simulator Hands on Lab
- Evaluating Chiller Performance

### Course Duration
Tuesday–Thursday
Class ends at 3:30 p.m. on Thursday

### Course Fee
$1800 per student
Absorber Operations/Maintenance
Course #2104, 2.0 CEU

This course teaches operators and technicians about the operation and controls associated with the YORK® lithium bromide absorption chillers. Absorption theory including P/T relationships and solution chemistry are also covered. The operation and operating procedures for both Isoflow (single stage) and Paraflow systems (two stage) are reviewed with an emphasis on preventive maintenance procedures.

**Course Topics**
- Basic Refrigeration Principles
- Units of Measure, Types of Heat
- Absorption Principles
- Solution Chemistry
- YIA Components and Cycle
- Water Circuits
- YPC Components and Cycle
- YPC Purge System
- Operating Information, Setpoints and Warnings
- System and Safety Cycling Shutdowns
- Operation and Maintenance
- Crystallization
- Unit Operation and Operational Limitations
- Refrigerant Contamination
- Heating/Cooling Changeover
- Preventive Maintenance
- Schedules
- Hands on Lab

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YCAV Air Cooled Rotary Screw Liquid Chillers*
Course #2103, 2.0 CEU

This three-day course teaches service personnel about the YCAV Chiller features, including the screw compressor, system ancillary components, unit operation and maintenance. *Dress code: For safety, closed-toe, leather shoes and long pants are required.

**Course Topics**
- Screw Chiller Basics
- Basic Electronics
- VSD Basics
- VSD and Control Panel Architecture
- Operation and Sequencing
- Latitude Simulator Exercises
- Information and Safety, Handling and Storage
- VSD Operation and Faults
- Maintenance
- Unit Troubleshooting
- Hands on Lab

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<table>
<thead>
<tr>
<th>Course Duration</th>
<th>Course Fee</th>
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<tbody>
<tr>
<td>Tuesday-Thursday Class ends at 3:30 p.m. on Thursday</td>
<td>$1800 per student</td>
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ENROLL NOW
YT/YK Centrifugal Chiller and Compressor Overhaul*
Course #2107, 3.3 CEU

Service personnel will become familiar with the operation and maintenance of centrifugal systems. Students will review R-11, R-123, R-22 and R-134a single stage centrifugal chillers. They will also learn the internal workings of the compressor, oil return system, lube circuit, purge and heat exchangers. The OptiView Control Center plus preventive maintenance and system checkout procedures are also addressed along with a hands-on teardown and rebuild of a YK centrifugal compressor. *Dress code: For safety, closed-toe, leather shoes and long pants are required.

Course Topics
- Refrigeration Theory
- Centrifugal Compressor Theory of Operation
- YT/YK Chiller Design and Component Functionality
- YT/YK Maintenance
- Seasonal Start-up
- Unit Troubleshooting
- Compressor Teardown/Reassembly
- OptiView Basics
- OptiView Operation
- OptiView Start-up and Troubleshooting
- High Speed Thrust Switch
- Proximity Probe
- Refrigerant Level Control
- Oil Pump Variable Speed Drive
- Hands on OptiView Labs

Course Duration
Monday-Friday
Class ends at 3:30 p.m. on Friday
Course Fee
$2700 per student

ENROLL NOW

YPAL Series 100 Packaged RTU
Course #2108, 1.3 CEU

Students will learn the theory of operation of the Constant Volume and Variable Volume Eco2 Rooftop Unit. Component functions, subsystems are also discussed, along with an introduction to the FlexSys Systems. The students will become familiar with the unit’s wiring and communication cards, and the programming and sequence operation.

Recommended Prerequisite:
Entry to Mid-Level Technician

Course Topics
- Safety Review
- Eco2 System Overview
- Constant Volume/Variable Volume Systems
- Eco2 Physical Data
- Unit Wiring
- Introduction to FlexSys System
- BAS Communication
- IPU Architecture
- Unit Configuration and Start-up
- Programming and Sequence of Operation

Course Duration
Tuesday-Thursday
Class ends at 3:30 p.m. on Thursday
Course Fee
$1800 per student

ENROLL NOW
YVAA Air Cooled Screw Chiller*
Course #2111, 1.3 CEU

This three-day course teaches experienced service technicians about the YVAA Chiller. The course will include features of this unit and the differences in installation, operation and maintenance from the YCAV. *Dress code: For safety, closed-toe, leather shoes and long pants are required.

Recommended Prerequisites:
• Working knowledge of the YCAV/YCIV Chiller
• Working knowledge of VSDs
• Understanding of basic electronics

Course Topics
• Chiller layout and components
• Safety, handling
• Installation
• Operation/Maintenance
• VSD
• Simulation Exercises

YLAA Chiller Start-up & Troubleshoot
Course #2114, 2.0 CEU

Students will learn the techniques, strategies and skills required to operate, repair, start-up and maintain York® YLAA chiller and YLPA heat pump/chillers using multiple scroll compressors in each system. The techniques acquired in this course may be applied to other York® small tonnage chillers and condensing units such as YCAL, YLUA and YCUL models.

Course Topics
• Safety
• Literature
• Theory
• Components
• Operations
• Wiring Diagrams
• Installation
• Startup
• Maintenance
• Evaluating Performance
• Warranty
TYPICAL SEQUENCE OF COURSES FOR METASYS® SYSTEMS

Focus on Engineering and Programming

Metasys® system extended architecture for Building Engineers (#389)

- Fundamental Control Strategies for HVAC Systems (#215)
- Introduction to Metasys® N2 Controllers (#4601)
- Metasys DX-9100 Operations/ Troubleshooting (#365)
- Metasys® FEC Operations/ Troubleshooting (#4703)
- Metasys® extended architecture Hardware and Troubleshooting (#4718)

OR

Focus on Maintenance and Troubleshooting

Metasys® system extended architecture for Building Operators (#388)

- Fundamental Control Strategies for HVAC Systems (#215)
- Introduction to Metasys® N2 Controllers (#4601)
- Metasys DX9100 Engineering (#364)
- Metasys® FEC Systems Engineering (#4707)
- Metasys® System Extended Architecture Engineering and Setup (#391)
- Metasys® System Extended Architecture Advanced Engineering (#397)
- Metasys® Graphics Generation Tool (#3002) (See Distance Learning)

Note: Your facility may utilize ASC controllers, DX, FEC controllers, or a combination of any of these products. Make certain to select the appropriate courses based on your facility.

Various courses include:

- Introduction to Metasys User Interface (#3021) (See Distance Learning)
- Eaton VSD Commissioning Certification (#232) (By request only)
- Series II VFD Commissioning Certification – JCI/Eaton (#233) (By request only)
- Metasys User Interface Graphics Editor (#3022) (See Distance Learning)
TYPICAL SEQUENCE OF COURSES FOR FACILITY EXPLORER®

Focus on Maintenance and Troubleshooting

Fundamental Control Strategies for HVAC Systems (#215)

Focus on Engineering and Programming

LONWORKS Orientation for Building Operators (#4715) (By request only)

Introduction to Metasys® N2 Controllers (#4601)

Metasys DX-9100 Operations/Troubleshooting (#365)

Facility Explorer MSTP Field Controller Engineering (#4714)

Facility Explorer Supervisory Controllers Engineering/N4 Certification (#4720)

Introduction to Metasys® N2 Controllers (#4601)

Metasys DX9100 Engineering (#364)

Advanced PCT Programming (#3001) (See Distance Learning)

Note: Your facility may include a variety of Metasys® and Facility Explorer equipment, making it appropriate for you to choose courses from this flowchart and from others in this section.
TYPICAL SEQUENCE OF COURSES FOR METASYS® VALIDATED ENVIRONMENTS

Engineers

- Fundamental Control Strategies for HVAC Systems (#215)
- Metasys® FEC Systems Engineering (#4707)
- Introduction to Metasys® N2 Controllers (#4601)
- Metasys DX9100 Engineering (#364)
- Metasys® System Extended Architecture Advanced Engineering (#397)
- Metasys® FEC Custom Programming (#4704)

Designers

- Metasys® System Extended Architecture Engineering and Setup (#391)
- Metasys® Graphics Generation Tool (#3002) (See Distance Learning)

Note: Your facility may include a variety of Metasys® and Facility Explorer equipment, making it appropriate for you to choose courses from this flowchart and from others in this section.
### Introduction to Metasys® N2 Controllers
**Course #4601, 2.7 CEU**

Introduction to the hardware, software, and tool components of the Metasys® N2 family of controllers. Learn how the hardware interconnects, the protocol used for communication, and the software and hardware tools used to operate and maintain N2 ASC and DX-9100 devices. ASC controllers include VAV, VMA, UNT, and AHU.

**Recommended Prerequisite:**
Fundamental Control Strategies for HVAC Systems (#215) or equivalent experience

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#### Course Topics
- Identify ASC and DX-9100 controllers and components
- Correctly use the software tools associated with N2 controllers
- Transfer files in N2 controllers
- Commission and tune N2 controllers
- Describe PRAC operation
- Operate the DX-9100 front panel
- Calibrate sensors used with N2 controllers
- Hands-on Lab

---

### Metasys® DX-9100 Engineering
**Course #364, 3.0 CEU**

Experienced DX-9100 users will learn how to create and modify the DX-9100 application programs using Windows-based GX-9100 software. This course is a follow-up to the Metasys® DX-9100 Operations/Troubleshooting course for students who want to develop their skills in programming and troubleshooting their DX-9100 system.

**Recommended Prerequisites:**
Fundamental Control Strategies for HVAC Systems (#215) and any Metasys® DX-9100 Operations/Troubleshooting (#365) and or field experience of DX front panel.

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#### Course Topics
- Introduction to the DX-9100 System
- Front Panel Operation
- DX Commissioning Tool
- Creating an Application Using GX-9100 Software
- Input Point Configuration
- Output Point Configuration
- Expansion Point Configuration
- Control Modules
- Numeric Modules
- Programmable Logic Controller
- Using Library Functions
- Student Topic Selected Lab
- Hands on Lab
- Final Review

---
Metasys® DX-9100 Operations/Troubleshooting
Course #365, 2.0 CEU

This introductory course teaches participants how to communicate and troubleshoot effectively using the DX-9100. This course is highly recommended for anyone involved in the day-to-day operation of a DX-9100 system.

Course Duration  |  Course Fee
---               |  ---
Tuesday–Thursday  |  $1800 per student
Class ends at 3:30 p.m. on Thursday

Course Topics
- Overview of the DX-9100 Controller
- Extension and Expansion Modules
- Front Panel Operation – Viewing Inputs/Outputs
- Time, Constants, PM Data, Schedules
- Front Panel Operation – Changing PM Data
- Constants, Auto/Manual Mode
- Introduction to the GX-9100 Program
- Commissioning Mode, Calibration
- Basic System Troubleshooting Using the DX-9100
- Loop Diagnosis Using Data Graphing
- Hands on Lab
- Final Review

Metasys® FEC Operations/Troubleshooting
Course #4703, 2.0 CEU

Designed as a beginners course for people working with Field Equipment Controllers (FECs), this course shows students how to connect to FECs and how to download and test existing control programs. It also covers calibration of input sensors and setup and verification of inputs and outputs. This course is designed for building personnel who want to better understand field controller operation, commissioning and troubleshooting.

Recommended Prerequisite:
Fundamental Control Strategies for HVAC Systems (#215) or equivalent experience

Course Duration  |  Course Fee
---               |  ---
Tuesday–Thursday  |  $1800 per student
Class ends at 3:30 p.m. on Thursday

Course Topics
- Introduction to Controllers
- CCT User Interface
- Mobile Access Portal
- Transferring Files
- Data Flow and Connections
- IO Commissioning
- Peer-to-Peer
- PRAC+ and PID
- Commissioning Programs
- Simulating Programs
- Hands-on Labs
- Final Review
Metasys® FEC Systems Engineering
Course #4707, 2.0 CEU

In this advanced Field Equipment Controller (FECs) programming class, students will learn how to write and test programs for the (FECs). They will use the software simulation tool to verify that the programs satisfy the sequence of operations. The course is designed for experienced personnel who want to become proficient in writing or revising programs for Johnson Controls FEC devices. Although not a prerequisite, it is highly recommended that students are familiar of the topics found in course #4703.

Recommended Prerequisite:
Fundamental Control Strategies for HVAC Systems (#215) or equivalent experience

For End Users and/or Authorized Building Controls Specialists/Contractors Only.

Course Duration | Course Fee
--- | ---
Tuesday-Thursday Class ends at 3:30 p.m. on Thursday | $1800 per student

Course Topics
- CCT User Interface
- Application Creation
- Setting Preferences
- Configuring a Local Display
- Peer-to-Peer
- Sideloops
- Advanced Application Controllers
- State Tables
- Data Flow and Connections
- Logic Blocks
- Adding Modules
- PRAC+ and PID
- Troubleshooting an Application
- Hands-on Labs
- Final Review

ENROLL NOW

Metasys® FEC Custom Programming
Course #4704, 2.0 CEU

Students will learn how to create and test customized control strategies for FEC controllers in this three-day course. The course is designed for experienced building personnel who want to expand their knowledge of HVAC Control Systems and Johnson Controls FEC devices.

Recommended Prerequisites:
Metasys® FEC Systems Engineering (#4707) and experience using the FEC software prior to attending 4704

For End Users and/or Authorized Building Controls Specialists/Contractors Only.

Course Duration | Course Fee
--- | ---
Tuesday-Thursday Class ends at 3:30 p.m. on Thursday | $1800 per student

Course Topics
- CCT User Interface
- Adding and Modifying Modules
- Logic Blocks
- File and Module Management
- PRAC+ and PID
- State Tables
- Sequencers
- Central Plant Application
- Hands-on Labs

ENROLL NOW
Metasys® System Extended Architecture for Building Operators
Course #388, 2.0 CEU

This three-day course teaches building personnel how to make the most effective and efficient use of the features of a Metasys® system extended architecture building management system. This course is for building personnel who have new installations of Metasys® system extended architecture using NAEs or NIEs or for those who have migrated from their existing Metasys® system.

Course Topics
- Metasys® System Extended Architecture Overview
- Help File System
- Basic Navigation of the System with the User Interface
- Commanding Objects
- Scheduling
- Setting Up Alarms
- Responding to Alarms
- Trending
- Totalization
- Graphics
- Hands on Lab
- Final Review

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Metasys® System Extended Architecture for Building Engineers
Course #389, 3.0 CEU

This course teaches building personnel how to make the most effective and efficient use of the features of a Metasys® system extended architecture building management system. This course contains additional topics not covered in the Metasys® system extended architecture for Building Operators course.

Course Topics
- Metasys® System Extended Architecture Overview
- Help File System
- Basic Navigation of the System with the User Interface
- Commanding Objects
- Scheduling
- Setting Up Alarms
- Responding to Alarms
- Trending
- Totalization
- Graphics
- Hands on Lab
- Final Review
- Audit Trails
- Sending Reports to Printers, Pagers, Emails, etc.
- Adding Inputs and Outputs to a Controller
- Reviewing Control Strategies
- Backing Up the Data
- Hands on Lab
- Final Review

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Metasys® System Extended Architecture
Engineering and Setup
Course #391, 3.0 CEU

Students will learn how to set up and manage the Network Automation Engine (NAE) database and to use the power of the System Configuration Tool to generate an NAE database from existing ASC controller programming.

Recommended Prerequisites:
Due to the material covered in the class, anyone wanting to enroll in this class is required to have had attended courses (#389) and (#4707) or (#353).

For End Users and/or Authorized Building Controls Specialists/Contractors Only.

Metasys® System Extended Architecture
Hardware and Troubleshooting
Course #4718, 3.0 CEU

This hands-on course provides experienced Metasys® users with valuable diagnostic and troubleshooting skills on system hardware. Discussions and exercises cover the full range of Metasys® Network products, with an emphasis on communication solutions and other commonly experienced problems.

Required Prerequisites:
Due to the material covered in the class, anyone wanting to enroll in this class is required to have had attended courses #389 and #4707 or #353.

For End Users and/or Authorized Building Controls Specialists/Contractors Only.

Course Topics
- Course Introduction
- System Overview and Comparisons
- NAE User Interface Overview
- System Configuration Tool Overview
- Adding BACnet® Devices
- Newest Feature Objects
- Overview: Designing a New Archive Database
- Installing Patches
- NIE and Migration Options Overview
- Hands on Lab
- Final Review

ENROLL NOW
### Metasys® System Extended Architecture Advanced Engineering
Course #397, 2.0 CEU

Experienced personnel will learn how to write advanced programs for facility-wide or specific mechanical control applications using the System Configuration Tool (SCT). Students will build, modify and troubleshoot routines they create.

**Recommended Prerequisites:**
Student must have background in operating and/or engineering the Metasys® system extended architecture. Metasys® system extended architecture Engineering and Setup (#391) or Metasys® system extended architecture for Building Engineers (#389).

**For End Users and/or Authorized Building Controls Specialists/Contractors Only.**

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<td>Class ends at 3:30 p.m. on Thursday</td>
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**Course Topics**
- Review Metasys® system extended architecture
- Control Objects (Interlocks, Multiple Commands, LCT, etc.)
- Reset Strategies
- Sequencing Equipment
- Rotation of Equipment
- Operating Equipment per Load Needs
- Lead Lag Strategies
- Creating Calculations Including Tonnage, Highest Daily, Temperature, etc.
- Student Directed Topics and Activities
- Hands on Lab
- Final Review

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### Facility Explorer MSTP Field Controller Engineering Course
Course #4714, 3.0 CEU

Participants will receive an overview of the Facility Explorer MSTP field controller system, create programs from standard tree systems using the Programmable Controller and Commissioning tool, then connect to Bluetooth® and Zigbee® connections and download code into the controllers after setting up the hardware and software to communicate properly.

**For End Users and/or Authorized Building Controls Specialists/Contractors Only.**

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<td>Class ends at 11:30 a.m. on Friday</td>
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**Course Topics**
- Introduction To The Facility Explorer MSTP Field Controllers System
- Creating Applications Using The Standards Tree
- Establish Peer To Peer Communications
- Using Bluetooth® To Connect To Controllers
- Downloading And Uploading Controllers
- Commissioning Inputs And Outputs
- Commissioning State Based Strategies
- Implementing Zigbee® Wireless Communications
- Making Custom Changes To Controllers
- Programming Blocks
- Analyzing PID Loops And Hybrid Activities
- Configuring Sequencers And Multistage Controllers
- Troubleshooting Network Systems
Basic instruction on design, engineer and program projects using FXWorkbench Pro running on Niagara 4. Testing for Niagara 4 Technical Certification Program (TCP) taken at end of the course.

**Recommended Prerequisites:**
Students must have a strong knowledge of Johnson Controls field controllers. A familiarization of building automation systems (BAS) would also be beneficial.

**For End Users and/or Authorized Building Control Specialists/Contractors only.**

Note: Early payment discount does NOT apply. If a student scores between 50% - 69% on their certification exam they may retake the certification exam for $1000.00. This exam will be emailed and once the practical is completed, arrangements must be made by the student to get their database back to their test proctor to be graded. No exceptions will be made for any score below 50%.

**Course Topics**
- Course Introduction and System Overview
- Supervisory Controller User Interface Overview
- FXWorkbench Pro Overview
- Creating a Station
- Adding N2 and BACNet® MSTP Controllers and Points
- Extension Manager and Extensions
- Control Logic
- Tagging Objects
- Scheduling
- Defining Users and Roles
- Customizing Access Permissions
- Setting up Email Notification of Alarms
- Graphics
- Controller Summary
- Hierarchy Services
- Commissioning and Backing up a Station
- Auto discovering BACNet® points
- Using Standard Graphics for Other Devices
- Enterprise Connectivity
- Technical Certification Program (TCP) Examination

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**Course Duration**
- Monday-Friday
- Testing will end at 5:00 p.m. on Friday

**Course Fee**
- $3200 per student

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**ENROLL NOW**
INSTRUCTOR-LED DISTANCE LEARNING COURSES
Advanced PCT Programming
Course #3001

Students will learn how to create and test customized control strategies for General Purpose Programmable Controllers (PCG) controllers in this three-day online course. The course is designed for experienced building personnel who want to expand their knowledge of HVAC Control Systems and Johnson Controls PCG devices.

Recommended Prerequisites:
Facility Explorer MSTP Field Controller Engineering (#4714) and PCG/PCV/PCX controller programming experience. Students will need phone and a computer with high speed internet access to participate in the course.

For End Users and/or Authorized Building Controls Specialists/Contractors Only.

Course Duration | Course Fee
--- | ---
3 Days | $1200 per student

Course Topics
- Central Plant Application in Programmable Controller Tool (PCT)
- Modules and Blocks in PCT
- Activities as Containers
- Hybrid Activities
- Proportional plus Integral plus Derivative (PID) and PID Pre-Processor
- State Tables
- Global Sequencer and Multi-stage Controller
- Pattern Recognition Adaptive Control (PRAC+) and Pulse Modulation Adaptive Control (PMAC)
- Review of Custom Lab
- Hands on Lab
- Final Review

Metasys® Graphics Generation Tool
Course #3002

This course teaches students how to create and modify the custom graphics used to both monitor and actively change building parameters and settings in a Metasys® automation system. It is a three-day online internet course which combines active instructor facilitation with student practice sessions with the facilitator available for questions. This course is for individuals interested in creating and editing Graphics+Metasys® graphic files using Graphics Generation Tool (GGT) software.

Recommended Prerequisites:
Metasys® system extended architecture for Building Engineers (#389) OR Metasys® system extended architecture Engineering and Setup (#391). Students will need phone and high speed internet access to participate in the course.

For End Users and/or Authorized Building Controls Specialists/Contractors Only.

Course Duration | Course Fee
--- | ---
3 Days | $1200 per student

Course Topics
- Provide an overview of the Graphics + tool with its features and terminology.
- Introduce the "Style Guide."
- Familiarize the student with how to commission graphics.
- Familiarize the student with how to create new graphics using the Graphic Generation Tool.
- Provide an opportunity for hands-on practice implementing key Graphics+tasks.
This course is designed for customers who have experience with the Metasys® User Interface, but want or need to learn how to create Metasys® UI Graphics. After completing this course, participants will be able to navigate the Metasys® Graphics Manager, import and export graphics, and associate a graphic to a space, equipment definition, or piece of equipment and add custom behaviors to a graphic.

Course Topics
- Access the Graphics Manager through the User Online/Offline
- Navigate the Graphics Manager
- Import and export graphics using the Offline User Interface
- Navigate through the Graphics Editor
- Create and edit the Master Layer for a site
- Create, edit, and associate a graphic to a space or piece of equipment
- Create and edit a floorplan
- Create and edit user defined graphics templates
- Add custom behaviors to graphics

ENROLL NOW
COURSES OFFERED BY REQUEST ONLY
COURSES OFFERED BY REQUEST ONLY

The following courses are only available at your request. They can usually be conducted at your site or at one of our Training Institute locations with a minimum of eight students.

These courses are not included in the Learning Catalog schedule at the back of this publication. For more information about the content, availability and pricing of these courses, call the Training Institute Registrar at 800-524-8540 or 414-524-4286 or email at cg-customer.registrar@jci.com.

YVWA Water Cooled Screw Chiller*
Course #2112, 1.3 CEU

This two-day course teaches experienced service technicians about the YVWA Chiller. The course will include features of this unit and the differences in installation, operation and maintenance from the YCAV.

*Dress code: For safety, closed-toe, leather shoes and long pants are required.

Recommended Prerequisites:
- Working knowledge of the YCAV/YCIV Chiller
- Working knowledge of VSDs
- Understanding of basic electronics

Course Topics
- Product Description
- Innovative Technology
- VSD Components and VSD Cooling Circuit
- VSD Operation and Faults
- Chiller Faults and Troubleshooting
- Chiller Maintenance
Eaton VSD Commissioning Certification Training
Course #232, 1.3 CEU

This course provides factory authorized certification of personnel responsible for commissioning the Johnson Controls VSD series product line. The first half of the instruction provides a high level of technical detail related to the setup and operation of the VSD series drive. The second half provides technical detail on how to diagnose and repair VFDs in general. Certified startup provides a 3rd year VFD warranty extension at no additional charge. Students will receive a training certificate upon course completion.

Series II VFD Commissioning Certification Training - JCI/Eaton
Course #233, 0.7 CEU

This 1 day class is taught by an Eaton representative and provides factory authorized certification of personnel responsible for commissioning the Johnson Controls VSD series II product line. The first half of the instruction provides a high level of technical detail related to the setup and operation of the VSD series drive. The second half provides technical detail on how to diagnose and repair VFD’s in general. Certified startups provide a 3rd year VFD warranty extension at no additional charge. Students will receive a training certificate upon course completion and you must be present for all days of class and pass a knowledge test to receive your training certificate.

Prerequisites:
Each student will be required to provide their own laptop, Internet patch cable ** and a digital multi-meter.
Metasys® HVAC ASC Engineering
Course #353, 3.0 CEU

This course covers programming and testing control strategies for Application Specific Controllers (ASCs). The course is designed for experienced building personnel who want to expand their knowledge of HVAC Control Systems and Johnson Controls ASC devices.

Recommended Prerequisites:
Fundamental Control Strategies for HVAC Systems (#215) or equivalent experience.

Metasys® HVAC ASC Operations/Troubleshooting
Course #381, 3.0 CEU

Students will learn about the Application Specific Controllers (ASC) used at their facility. Extensive hands-on lab activities use HVACPRO software to work with AHU, UNT, VAV and VMA controllers for troubleshooting programs and field devices.

Recommended Prerequisite:
Fundamental Control Strategies for HVAC Systems (#215) or equivalent experience.
LEARNING PACKAGES

Learn what you need, when you need it with Johnson Controls Training Institute Learning Packages. Learning packages are a way to prepare for an instructor-led course or to review material you may not use everyday. While some packages are generic in content, all are oriented toward Johnson Controls equipment to provide additional assistance and information in using our products.

Written Material
Sometimes we need to “see it on paper” in order to believe it. Our workbooks contain hands-on lab activities for you to complete using your own equipment, in your own facility.

To Order Call
Quantity, site and educational discounts are available for most packages. Call 800-524-8540 for details.

HVAC Controls Manual (P2074)

This handy reference provides a clear, concise explanation of the application of pneumatic controls to HVAC systems. (©1987 Johnson Controls, Inc.)

Price: $50.00
Topic Outline:
- Basic Control Concepts, Fan Systems
- Pneumatic Power Supplies, Pneumatic Relays
- Room Thermostats and Humidistats
- Valves and Actuators
- Dampers, Actuators and Positioners
- Auxiliary Devices, Dual Setpoint Thermostats
- Pneumatic Transmission, Master/Submaster

Building Environments: HVAC Systems (P99)

This comprehensive, easy-to-read text builds your understanding of HVAC systems and the controls that manage them. (©1997 Johnson Controls, Inc.)

Price: $99.00
Topic Outline:
- HVAC Systems and Facility Management
- Heat, Temperature and Pressure Basics
- Managing Human Comfort
- Determining Loads on an HVAC System
- Psychrometrics, HVAC System Types
- Heat Exchange and Recovery Equipment
- Refrigeration Cycle and Equipment
- Centrifugal Pumps and Hydrone Systems
- Air Cleaning Equipment, Fans, Ducts, Humidifiers
- Control Strategies for Occupant Comfort
- Advanced Technology for Effective Facility Control
### LEARNING PACKAGES ORDER FORM

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**Payment Method Selected**

- Payment must be received prior to shipment.
- Visa® or MasterCard® or American Express®

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(Signature) (Email address to send receipt)

- Check for $ (in U.S. Currency), payable to Johnson Controls Training Institute.
- Please attach check to the form.

Provide complete shipping address to avoid delays in processing your order. Orders are processed within 72 hours.

- UPS Ground (Allow 7-10 days delivery time)
- Airborne Next Day Air (Orders placed after 2:00 CST will be processed the next working day.)
- Special Handling – Ship via

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**Shipping and Handling**

(Shipping charges will be added)

(Shipping charges will be added)

(In accordance with your state sales tax laws)

**Tax Due**

(U.S. Dollars)

**Total** 0.00

Fax: 877-403-6625

**Or mail form and payments to:**

Johnson Controls Training Institute/M45
507 East Michigan Street
Milwaukee, WI 53202

**Questions about your order? Call Learning Services at 800-524-8540.**

(Please print additional copies of this form, if necessary, for further reference or use.)
FACILITY O&M WORKFORCE ASSESSMENTS AND DEVELOPMENT SOLUTIONS

With Facility Operation & Maintenance (O&M) budgets continuing to shrink, why waste limited training dollars on courses your workforce may not need? The Johnson Controls Training Institute can maximize your training investments by assessing your Facility O&M Staff Skills and working with your teams to identify the best development solutions to meet your facility performance goals.

The Johnson Controls Training Institute has more than 60 years of success developing people to operate and maintain buildings. We assist large and small workforces in hospitals, education facilities, pharmaceutical companies, office buildings, utility companies, and government facilities.

Our services are customized for your needs and typically include the steps below:

**STEP 1:** Review Facility Strategies and Desired Outcomes
**STEP 2:** Complete Site-specific Skill Assessments by Job Roles
**STEP 3:** Analyze Root Causes of Staff Performance Gaps
**STEP 4:** Design and Deploy Solutions and Development Maps
**STEP 5:** Assess Outcomes and Track Results on Scorecards

For more information or to review examples of our assessment and development services, visit [www.johnsoncontrols.com/institute](http://www.johnsoncontrols.com/institute) or contact our Facility O&M Development professionals at 800-524-8540.

Our site-specific Skill Assessments are detailed to ensure an accurate review of your Facility O&M staff skills by job role. These can be self-assessments, supervisor-assessments, online testing, and/or hands-on performance assessments based on your facility needs. Any technical, customer service, or leadership job roles and skills can be assessed. Below are a few examples of client job roles.

- HVAC & Equipment Technicians
- Control & Automation Technicians
- Control & Automation Engineers
- Energy Management Specialists
- Work Management & Facility Analysts
- Utility Plant & Boiler Operators
- Facility Operators & Facility Controllers
- Electricians & Telecommunication Techs
- Steamfitters & Sheet Metal Workers
- Pipefitters & Stationary Engineers
- Plumbers & Refrigeration Mechanics
- Carpenters, Locksmiths, & Painters
- Building Engineers & Facility Engineers
- Operation & Maintenance Specialists
- Safety Coordinators & Groundskeepers
- Security and Fire System Technicians
- Service Coordinators & Billing Specialists
- Maintenance Management System Administrators
- Operation & Maintenance Supervisors
- Facility Managers & Directors

We work with your teams to design solutions and development maps for your facility needs. These solutions may include hands-on training, self-study learning, on-site coaching, project assignments, O&M strategy updates, process improvements, organization updates, rewards, new equipment, performance support tools and cheat sheets.
HOW TO ENROLL IN A COURSE

Enroll Online
Register and purchase trainings online with credit cards, all at one location. www.jcitraininginstitute.com

View Our Course Schedule
Check classes that are open for enrollment and check the current status of a class. www.johnsoncontrols.com/institute

Browse Courses
Visit www.johnsoncontrols.com/institute for new classes and special discounts.
We encourage you to register for classes online at: www.jcitraininginstitute.com. This form should be used by those unable to register online, such as government agencies, and Johnson Controls branch offices. You can fill the form out then print this page and either email (cg-customer.registrar@jci.com) or fax (877-403-6625) it to the Johnson Controls Training Institute.

### Student Information
- **Name of Applicant (Please Print)**
- **Student E-mail Address (REQUIRED FOR CONFIRMATION / CANCELLATION NOTIFICATION)** Please provide a unique email address for each applicant.
- **Company/Organization Name**
- **Company/Organization Address (No P.O. Box)**
- **City**
- **Telephone Number** (            )               -
- **Fax Number** (            )               -

### Course Registration Information
- **Course Name**
- **Course #**
- **Location**
- **First Choice Date**
- **Second Choice Date**
- **Prerequisite Course Completion Date**

Payment must be received 10 days prior to course start date.

- Early Payment Discount of $100 for each student’s tuition if full payment is received 30 days prior to the start of the course.
- **Early Payment Discount does NOT apply to any voucher payments or distance learning or to course #4720 Facility Explorer (FX) Supervisory Controllers Engineering Certification.**
- **5-pack**
- **10-pack**
- **Personal 3-pack Course Vouchers:** See page 5 for details

### Payment Method Selected:
- Visa®
- MasterCard®
- American Express®

Payment Policy
Please include check or credit card information with your application. To mail your application and payment, use Institute address (below). Thank you.

Tax Deduction
U.S. Treasury Regulation 1.162.5 permits an income tax deduction for educational expenses incurred to maintain or improve professional skills. Consult your tax advisor for details.

For Johnson Controls Branch Use Only
- Installation Contract #
- Salesperson Name

### Cancellation Policy
Refunds are issued only if you notify the Institute at 414-524-4286 or 800-524-8540 that you cannot attend, no less than ten business days prior to the start of the course. You are liable for the entire course fee if cancellation is received after this deadline; you may substitute another student, or enroll in another session. Johnson Controls reserves the right to cancel classes and assumes no liability for expenses, all registrants will be notified at least ten days before the start of class.

**Mail form and payments to:**
Johnson Controls Training Institute/M45
507 East Michigan Street
Milwaukee, WI 53202

**Telephone:**
414-524-4286
800-524-8540

**Fax:**
877-403-6625

**Internet:**
www.johnsoncontrols.com/institute

For End Users and/or Authorized Building Controls Specialists/Contractors Only.
# 2020 Class Schedule

## HVAC INDUSTRY COURSES

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<th>Course Name</th>
<th>Course #</th>
<th>Page #</th>
<th>Start-End (Days)</th>
<th>Course Fee</th>
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## BUILDING AUTOMATION SYSTEMS COURSES

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## Instructor Led Distance Learning & eLearning Courses

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These dates are subject to change. Please verify the dates and location and look for new course offerings at [www.jcitraininginstitute.com](http://www.jcitraininginstitute.com).
## 2020 Class Schedule

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**Instructor-Led Distance Learning & eLearning Courses**

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**KEY for INSTITUTE LOCATIONS:**

- BAL (Baltimore)
- BOS (Boston)
- DAL (Dallas)
- DL (Distance Learning)
- HOU (Houston)
- IND (Indianapolis)
- MKE (Milwaukee)
- LOU (Louisville)
- PHX (Phoenix)
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