




Training Catalog 2016

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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 to provide high-quality learning experiences that reflect not only where the industry is today, but where it is going tomorrow.

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 opportunity that meets your needs in our ever-expanding curriculum
- 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) ©1993, all rights reserved.



Training Options to Meet Your Needs

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 20. 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 Interactive CD-ROMs, computer-based training programs, DVDs, and 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 are on page 55 and information about our learning packages begins on page 63.

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 inquire about scheduling a course, contact the Learning Institute at 414-524-4286 or cg-customer.registrar@jci.com.

Training Options to Meet Your Needs

Onsite Learning Programs

Johnson Controls Training Institute can help you make the most of our investment in learning by bringing our 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 material and reference material for all student

Enrollment Information

Schedule of Classes

The 2016 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.

- A 10-pack of training vouchers is \$14,590. 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 \$7,735. Vouchers are good for one year from the date of purchase and must be used for regularly scheduled Training Institute classes.
- The Personal Passport is valid for a specified individual for any three classes and is good for one year from the date of purchase. The Personal Passport is \$4,110.

Substitutions and Cancellations

Should anything prevent your ability to attend a course, a substitute student is always welcome at no additional fee. A refund will be issued by visiting www.jci-training-institute.com and canceling your enrollment at least 14 days prior to the start of the course. If cancellation is made less than 14 days prior to 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.

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.”

Online Enrollment

To browse our catalog and enroll for our courses, please visit our website:
www.jci-training-institute.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® or MasterCard®.

All necessary course materials are included in the tuition listed in each course description.

Hotel Accommodations and Training Institute Maps

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.

Holiday Inn Express Hunt Valley

11200 York Road
Hunt Valley, MD 21030
410-527-1500

Embassy Suites

213 International Circle
Hunt Valley, MD 21030
410-584-1400

Residence Inn - Hunt Valley

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

Greater Baltimore Convention and Visitor Bureau

www.baltimore.org

Boston, Massachusetts

39 Salem Street, Lynnfield, MA 01940

Located approximately 12 miles from Boston's Logan International Airport.

Hampton Inn

59 Newbury Street (Route 1)
Peabody, MA 01960
978-536-2020

Sheraton Colonial

1 Audubon Road
Wakefield, MA 01880
781-245-9300

Springhill Suites by Marriott

43 Newbury 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

Hotel Accommodations and Training Institute Maps

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www.johnsoncontrols.com/institute

Dallas, Texas

3021 West Bend Drive, Irving, TX 75063

Located 6 minutes from the Dallas Fort Worth International Airport.

Element

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

Holiday Inn Express

4550 W. John Carpenter Frwy (Hwy 114)
Irving, TX 75063
972-929-4499

Wingate by Wyndham

8220 Esters Boulevard
Irving, TX 75063
972-929-4600

Greater Dallas Convention and Visitor Bureau

214-571-1300
www.dallascvb.com

Hotel Accommodations and Training Institute Maps

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www.johnsoncontrols.com/institute

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.

Crowne Plaza

12801 Northwest Freeway
Houston, TX 77040
713-462-9977

Comfort Inn

7887 W. Tidwell
Houston, TX 77040
713-690-1493

Hampton Inn

12909 Northwest Freeway,
Houston, TX 77040
713-939-7100

Greater Houston Convention and Visitor Bureau

www.visithoustontexas.com

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www.johnsoncontrols.com/institute

Indianapolis, Indiana

1255 North Senate Avenue, Indianapolis, IN 46202

Located approximately 15 minutes from the Indianapolis International Airport.

Courtyard Marriott Indianapolis at the Capital

320 North Senate Ave
Indianapolis, IN 46204
317-684-7733

Residence Inn Marriott Canal

350 West New York Street
Indianapolis, IN 46202
317-822-0840

Hampton Inn Indianapolis Downtown

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

Greater Indianapolis Convention and Visitor's Bureau

www.visitindy.com/

Louisville, Kentucky

9410 Bunsen Parkway, Suite 100, Louisville, KY 40220

Located approximately 10 miles from Louisville International Airport.

Hyatt Place – East

701 South Hurstbourne Parkway
Louisville, KY 40222
502-426-0119

Greater Louisville Convention and Visitor's Bureau

www.gotolouisville.com

Hotel Accommodations and Training Institute Maps

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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.

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 & Visitor's Bureau

414-273-7222 / 800-231-0903
www.milwaukee.org

Hotel Accommodations and Training Institute Maps

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www.johnsoncontrols.com/institute

Phoenix, Arizona

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

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

Holiday Inn and Suites – Phoenix Airport

3220 S. 48th Street
Phoenix, AZ 85040
480-543-1700

Residence Inn – Phoenix Airport

801 North 44th Street
Phoenix, AZ 85008
602-273-9220

Greater Phoenix Convention and Visitor Bureau

www.arizonaguide.com

Hotel Accommodations and Training Institute Maps

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

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.

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

Orange County Visitor Information

877-GO-ORANGE
www.anahiemoc.org

Greater Los Angeles Convention and Visitor Bureau

213-689-8822
www.latourist.com/

Hotel Accommodations and Training Institute Maps

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www.johnsoncontrols.com/institute

Tampa, Florida

3802 Sugar Palm Dr, Tampa FL 33619

Located 12 miles from the Tampa International Airport.

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

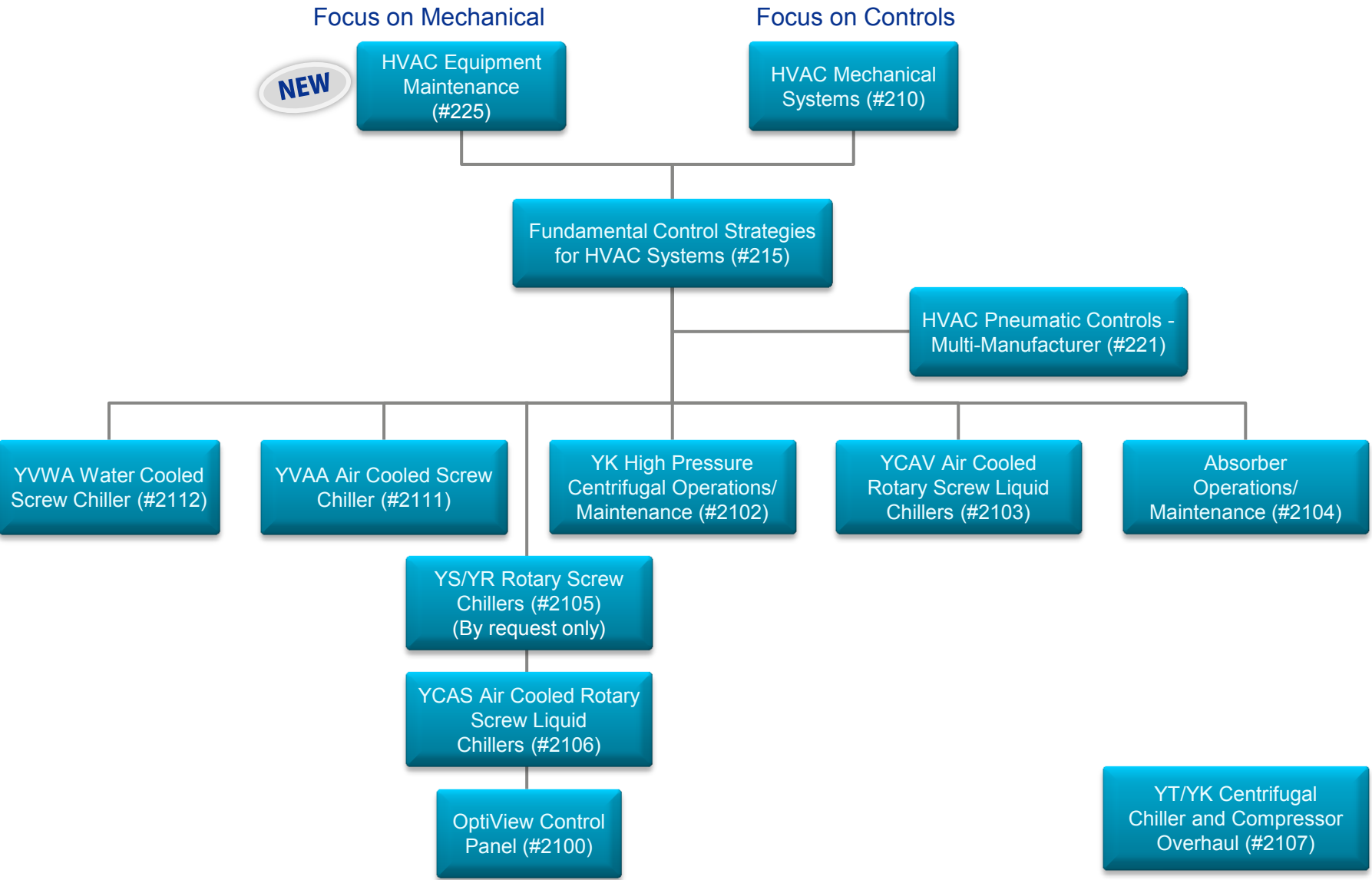
3624 North Falkenburg
Tampa, FL 33619
813-227-4004

Greater Tampa Convention and Visitor Bureau

www.visittampabay.com

Typical Sequence of HVAC Industry Courses

 Click on a course to view its details.



YT/YK Centrifugal Chiller and Compressor Overhaul (#2107)

Contractor Course

HVAC Mechanical Systems

Course #210, 3.0 CEU

The fundamentals of HVAC mechanical equipment operation are taught in this introductory, 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 an 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 Labs
- Final Review

Course Duration:

Monday–Friday
Class ends at 11:30 a.m. on Friday

Course Fee:

\$1670 per student

HVAC Industry Courses



 [Enroll for this Course](#)

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 Labs
- Final Review


Course Duration:

Monday–Friday
Class ends at 11:30 a.m. on Friday

Course Fee:

\$1670 per student



 [Enroll for this Course](#)

HVAC Equipment Maintenance

Course #225, 2.0 CEUs

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. The boiler portion of this course can be used as review for a local boiler license exam.

Course Topics

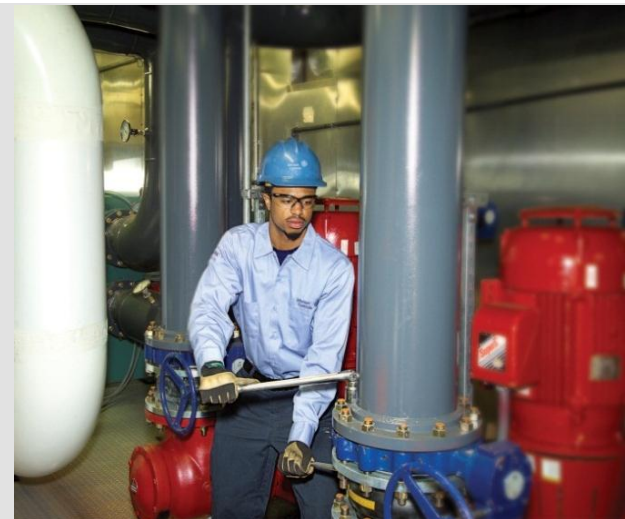
- Overview of HVAC
- Electrical Systems
- OSHA Lockout/Tagout Training
- Refrigeration Maintenance and Troubleshooting
- Centrifugal Systems Overview
- Pump Maintenance
- Cooling Towers
- Air Handling Systems
- Boilers
- Air Compressor Maintenance
- Hands-on Labs
- Final Review

Course Duration:

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

Course Fee:

\$1520 per student



 [Enroll for this Course](#)

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 number of manufacturers.

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:

\$1520 per student

Recommended Prerequisite:

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



 [Enroll for this Course](#)

OptiView Control Panel

Course #2100, 1.3 CEU

This two-day course for service personnel covers the 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 Labs

Course Duration:

Tuesday-Wednesday
Class ends at 3:30 p.m. on Wednesday

Course Fee:

\$1270 per student



 [Enroll for this Course](#)

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 Labs
- Evaluating Chiller Performance


Course Duration:

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

Course Fee:

\$1520 per student



 [Enroll for this Course](#)

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, start-up procedures, unit operation and maintenance.

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
- Installation
- Commissioning
- VSD Troubleshooting
- Maintenance
- Unit Troubleshooting
- Hands-on Labs

Course Duration:


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

Course Fee:

\$1520 per student

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



 [Enroll for this Course](#)

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
- YPC Purge System
- Operating Information, Setpoints and Warnings
- System and Safety Cycling Shutdowns
- Data Logging
- Operation and Maintenance
- Crystallization
- Unit Operation and Operational Limitations
- Refrigerant Contamination
- Heating/Cooling Changeover
- Preventive Maintenance
- Schedules
- Hands-on Labs


Course Duration:

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

Course Fee:

\$1520 per student



 Enroll for this Course

YCAS Air Cooled Rotary Screw Liquid Chillers*

Course #2106, 1.3 CEU

Students will become familiar with system components and functions, refrigerant flow, compressor capacity control and start-up procedures. They will also review the operation and maintenance procedures for the chiller and ancillary systems, including MicroPanel operation, setup and service procedures.

Course Topics

- Introduction to Screw Technology
- Compressor Construction
- Mechanical Operation
- Mechanical Troubleshooting
- Mechanical Maintenance
- Electrical Troubleshooting
- Installation Requirements
- Control Panel: Internal Layout
- System Parameters and Logic Controls
- Board In/Out Connection
- Wiring Diagrams
- Motor Protection and Communication with BAS
- Hands-on Labs

Course Duration:


Tuesday-Wednesday
Class ends at 3:30 p.m. on Wednesday

Course Fee:

\$1270 per student

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



 [Enroll for this Course](#)

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.

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 Bearing Limit Switch
- Refrigerant Level Control
- Oil Pump Variable Speed Drive
- Hands-on Labs

Course Duration:

Monday-Friday
Class ends at 3:30 p.m. on Friday

Course Fee:

\$2570 per student

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



 [Enroll for this Course](#)

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.

Course Topics

- Chiller layout and components
- Safety, handling
- Installation
- Commissioning
- Start-up
- Operation/Maintenance
- Troubleshooting
 - VSD
 - Unit
- Simulation Exercises

Course Duration:

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

Course Fee:

\$1520 per student

Recommended Prerequisites:

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

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



 [Enroll for this Course](#)

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.

Course Topics

- Product Description
- Innovative Technology
- VSD Components and VSD Cooling Circuit
- VSD Operation and Faults
- Chiller Faults and Troubleshooting
- Chiller Maintenance

Course Duration:

Tuesday-Wednesday
Class ends at 3:30 p.m. on Wednesday

Course Fee:


\$1270 per student

Recommended Prerequisites:

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

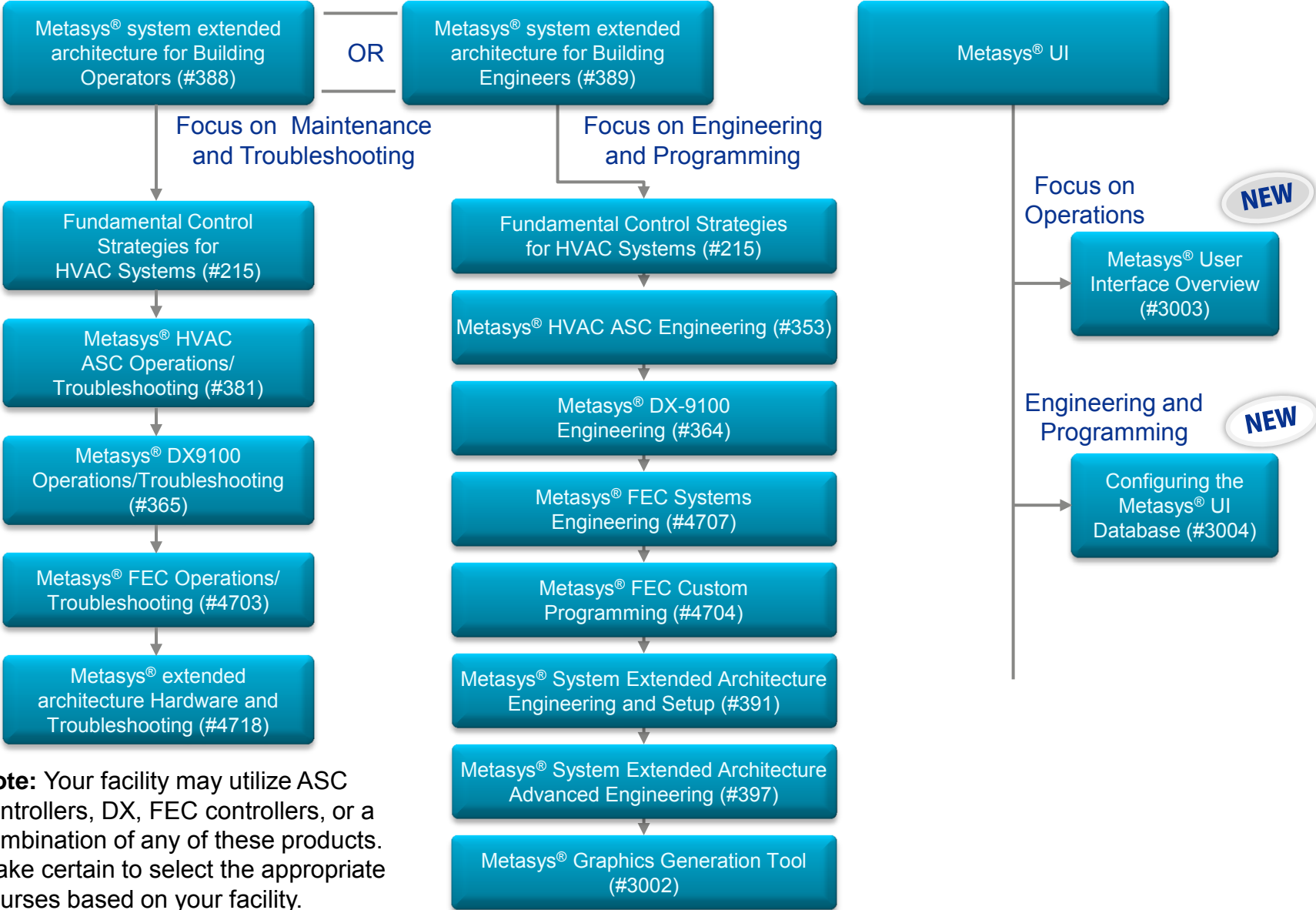
***Dress code: For safety, closed-toe, leather shoes and long pants are required.**



 [Enroll for this Course](#)

Typical Sequence of Courses for Metasys® Systems

Click on a course to view its details.



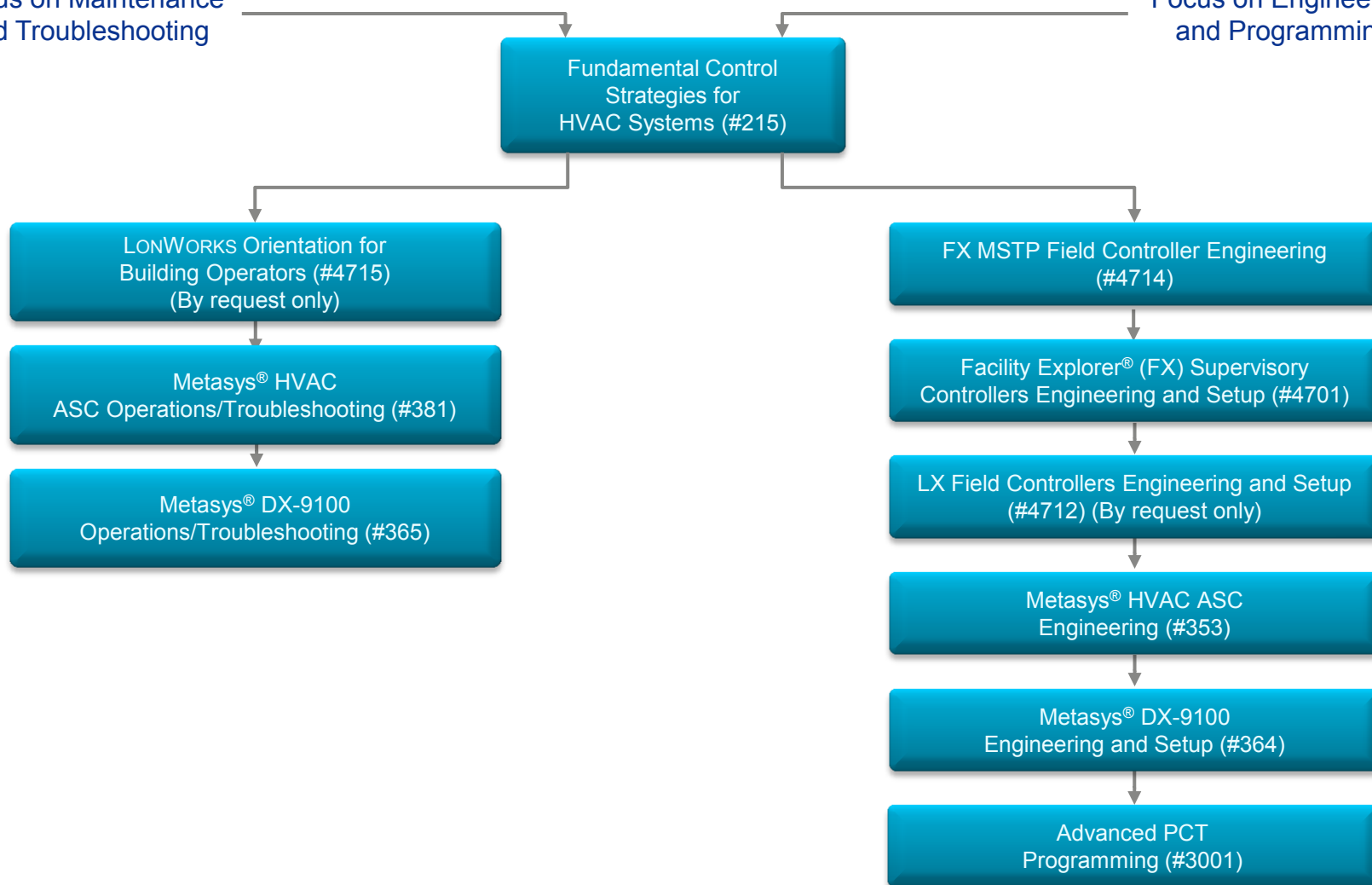
Note: Your facility may utilize ASC controllers, DX, FEC controllers, or a combination of any of these products. Make certain to select the appropriate courses based on your facility.

Typical Sequence of Courses for Facility Explorer®

 Click on a course to view its details.

Focus on Maintenance and Troubleshooting

Focus on Engineering and Programming



Note: Your facility may include a variety of Metasys® and FX equipment, making it appropriate for you to choose courses from this flowchart and from others in this section.

Typical Sequence of Courses for Metasys® PMI/NCM Networks

 Click on a course to view its details.



Typical Sequence of Courses for Metasys® Validated Environments

 Click on a course to view its details.



Note: Your facility may include a variety of Metasys® equipment, making it appropriate for you to choose courses from this flowchart and from others in this section.

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.

Course Topics

- ASC Controllers
- Control Theory Terminology and Strategies
- ASC Configuration Files
- File Names and Locations
- HVACPRO Overview
- Downloading and Commissioning ASC Controllers
- Loop Tuning
- Adding Points to an ASC
- Writing a Configuration File
- UNT Controller
- AHU Controller
- VAV Controller
- VMA Controller
- Sideloops
- Optional Labs
- Hand-held Interfaces: Zone Terminal and VMA
- Balancing Tool
- Point Mapping to Supervisory Controller
- Misc. Controllers, Products, Topics
- Hands-on Labs
- Final Review

Course Duration:

Monday-Friday

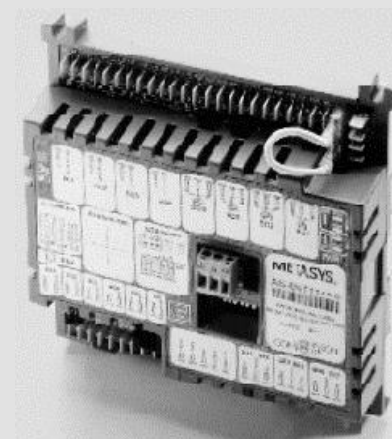
Class ends at 11:30 a.m. on Friday

Course Fee:

\$1820 per student

Recommended Prerequisite:

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



 [Enroll for this Course](#)

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.

Course Topics

- Overview of ASC Controllers
- Control Theory
- Control Strategies
- File Names and Locations
- HVACPRO Overview
- Downloading and Commissioning ASC Controllers
- UNT Controller
- AHU Controller
- VAV Controller
- VMA Controller
- Sideloops
- Loop Tuning
- Hand-held interfaces: Zone Terminal and VMA
- Balancing Tool
- Hands-on Labs
- Final Review

Course Duration:

Monday-Friday
Class ends at 11:30 a.m. on Friday

Course Fee:

\$1820 per student

Recommended Prerequisite:

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



 [Enroll for this Course](#)

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.

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 Labs
- Final Review

Course Duration:

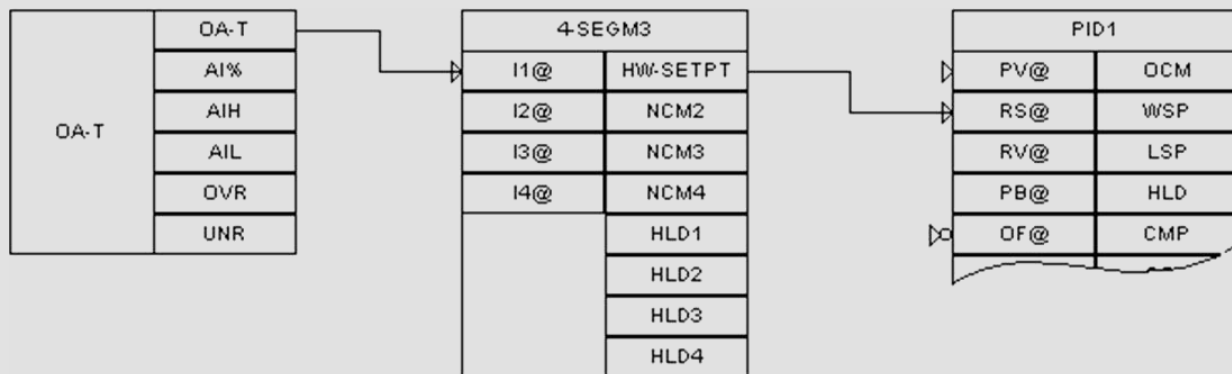
Monday-Friday
Class ends at 11:30 a.m. on Friday

Course Fee:

\$1930 per student

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



 [Enroll for this Course](#)

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 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 Labs
- Final Review

Course Duration:

Tuesday–Thursday


Class ends at 3:30 p.m. on Thursday

Course Fee:

\$1520 per student

Building Automation Systems Courses



 [Enroll for this Course](#)

Metasys® FEC Systems Engineering

Course #4707, 2.0 CEU

In this class, more advanced students will learn how to write and test programs for Field Equipment Controllers (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 recommended that students are familiar of the topics found in course 4703.

Course Topics

- Review of CCT Software as a programming tool
- Reading Control Strategies
- Creating New Applications
- State Control Concepts
- Data Flow and Program Analysis
- Simulation mode in CCT
- Writing Sideloop Programs
- Hands-on Labs
- Final Review

Course Duration:

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

Course Fee:

\$1520 per student

Recommended Prerequisite:

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

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



 Enroll for this Course

Metasys® FEC Operations/Troubleshooting

Course #4703, 2.0 CEU

This basic course shows students how to connect to Field Equipment Controllers (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.

Course Topics

- FEC Controller Overview
- Bluetooth Wireless Setup
- Downloading and Uploading FEC Controllers
- Input and Output Setup and Checkout
- MS/TP Trunk wiring, addressing and checkout
- Overview of CCT Software Tool
- Trunk Utilities
- Hands-on Labs
- Final Review

Course Duration:

Tuesday–Thursday

Class ends at 3:30 p.m. on Thursday

Course Fee:

\$1520 per student

Recommended Prerequisite:

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



Enroll for this Course

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.

Course Topics

- Central Plant Application in CCT
- Modules and Blocks in CCT
- Activities as Containers
- Hybrid Activities
- PID and PID Pre-Processor
- State Tables
- Sequencer and Multi-stage Controller
- PRAC+ and PMAC
- Review of Custom Lab
- Hands-on Labs
- Final Review

Course Duration:

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

Course Fee:

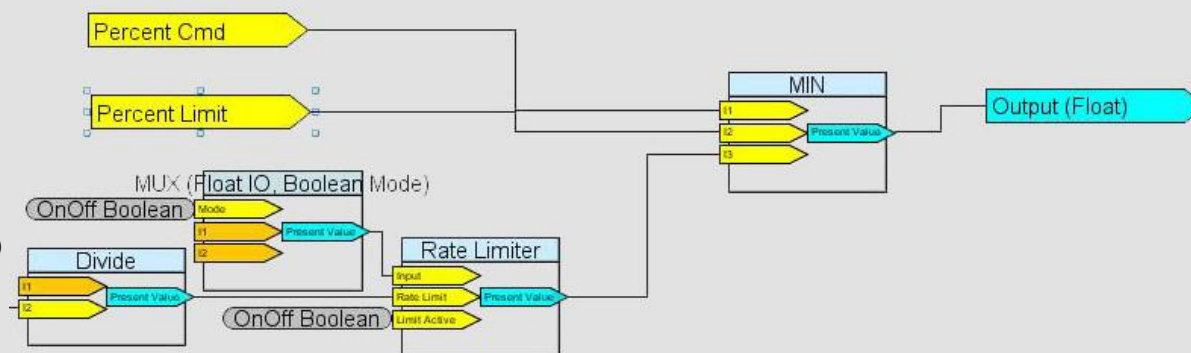
\$1520 per student

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.

 [Enroll for this Course](#)



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

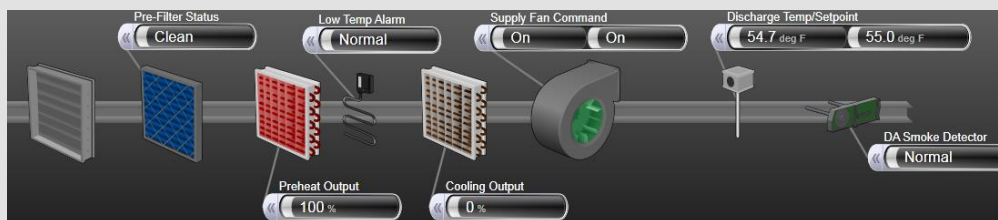
- Metasys® System Extended Architecture Overview
- Help File System
- Basic Navigation of the System with the User Interface
- Commanding Objects
- Scheduling
- Setting Up Alarms
- Responding to Alarms
- Trending
- Totalization
- Graphics
- Hands-on Labs
- Final Review

Course Duration:

Monday–Wednesday
Class ends at 3:30 p.m. on Wednesday

Course Fee:

\$1520 per student



 [Enroll for this Course](#)

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

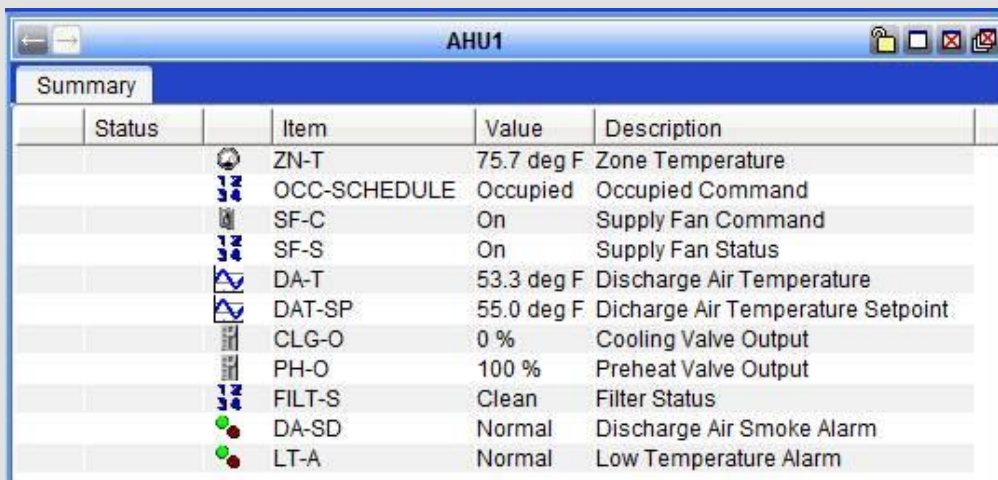
- Metasys® System Extended Architecture Overview
- Help File System
- Basic Navigation of the System with the User Interface
- Commanding Objects
- Scheduling
- Setting Up Alarms
- Responding to Alarms
- Trending
- Totalization
- Graphics
- Setting Up Passwords
- User Views
- Audit Trails
- Sending Reports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












Course Duration:

Monday–Friday
Class ends at 11:30 a.m. on Friday

Course Fee:

\$1820 per student



Status	Item	Value	Description
	ZN-T	75.7 deg F	Zone Temperature
	OCC-SCHEDULE	Occupied	Occupied Command
	SF-C	On	Supply Fan Command
	SF-S	On	Supply Fan Status
	DA-T	53.3 deg F	Discharge Air Temperature
	DAT-SP	55.0 deg F	Discharge Air Temperature Setpoint
	CLG-O	0 %	Cooling Valve Output
	PH-O	100 %	Preheat Valve Output
	FILT-S	Clean	Filter Status
	DA-SD	Normal	Discharge Air Smoke Alarm
	LT-A	Normal	Low Temperature Alarm

 [Enroll for this Course](#)

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.

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 Labs
- Final Review

Course Duration:

Monday–Friday
Class ends at 11:30 a.m. on Friday

Course Fee:

\$1930 per student

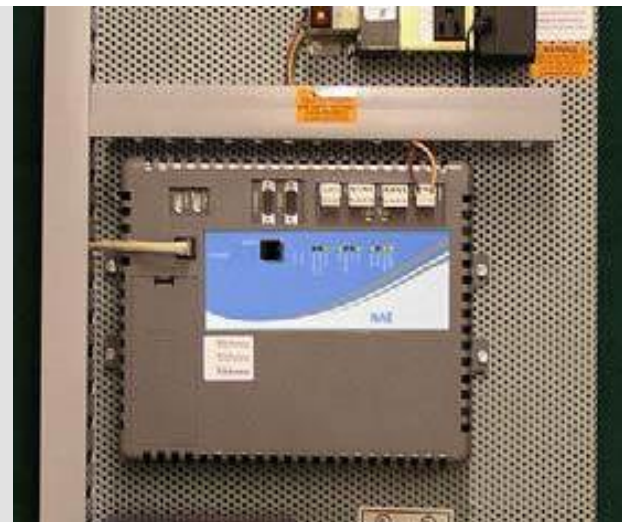
Recommended Prerequisites:

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.



[Enroll for this Course](#)



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.

Course Topics

- Metasys® extended architecture Review
- Network Architecture
 - Ethernet Level Connections (BACnet over IP)
 - Controller Trunk Level Connections (BACnet/MSTP, N2, and LON)
 - SA Bus Review
- Network Automation Engines, Network Integration
- Engines and Network Controller Engines including:
 - NAE common hardware platform
 - NAE Diagnostics, how to run them and evaluate them.
- Introduction to the SCT Tool
- Short Review FEC Controller Family; FECs, VMAs and IOM Modules, and TEC Controllers
- Calibrating Sensors and Actuators and Applying Metering Devices
- Downloading Controllers
- Msea Database overview and organization best practices
- ADS/ADX Servers – their role and features in Metasys® and best practices for backup of data files.

Course Duration:

Monday–Friday
Class ends at 11:30 a.m. on Friday

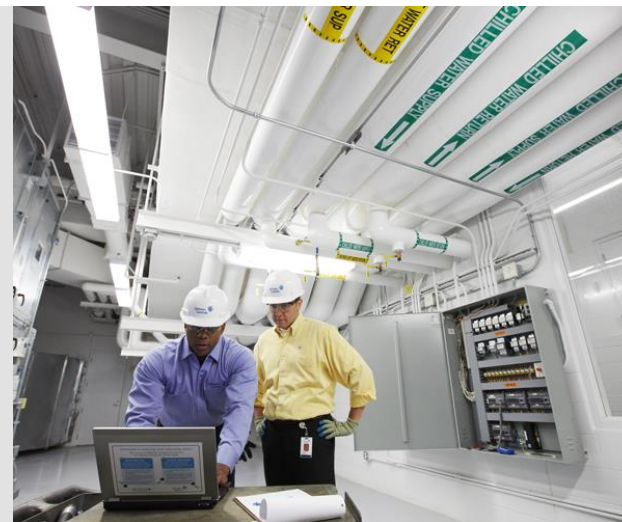
Course Fee:

\$1880 per student

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.



 [Enroll for this Course](#)

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.

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 Labs
- Final Review

Course Duration:

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

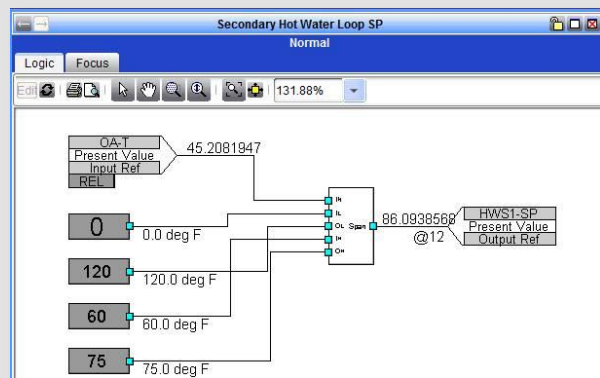
Course Fee:

\$1520 per student

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.



 Enroll for this Course

Facility Explorer® (FX) Supervisory Controllers Engineering and Setup

Course #4701, 3.0 CEU

Students will be able to make the most of their Facility Explorer® by learning how to set up and manage the Facility Explorer® Supervisory Controllers.

Course Topics

- Course Introduction and System Overview
- Supervisory Controller User Interface Overview
- Creating a Station
- Adding N2 Controllers and Points
- Extension Manager and Extensions
- Scheduling
- Control Logic
- Defining Users
- Setting Up Email Notification of Alarms
- Johnson Controls Alarm Portal
- Graphics & Customizing the System
- Downloading and Uploading Supervisory Controllers
- Autodiscover BACnet, LON and NDIO Points
- Adding FX LON Controllers and Points
- Using Standard Graphics for other Devices
- Customizing Access Permissions
- Installing Updates, Backing up the Database
- Server Setup
- Enterprise Connectivity
- Hands-on Labs
- Final Review

Course Duration:

Monday–Friday

Class ends at 11:30 a.m. on Friday

Course Fee:

\$1870 per student

Recommended Prerequisites:

Student must have a strong knowledge of the Johnson Controls field controllers. A familiarization with BAS systems would also be beneficial.

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



 [Enroll for this Course](#)

FX MSTP Field Controller Engineering

Course #4714, 3.0 CEU

Participants will receive an overview of the FX 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.

Course Topics

- Introduction To The FX 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

Course Duration:

Monday–Friday

Class ends at 11:30 a.m. on Friday

Course Fee:

\$1870 per student

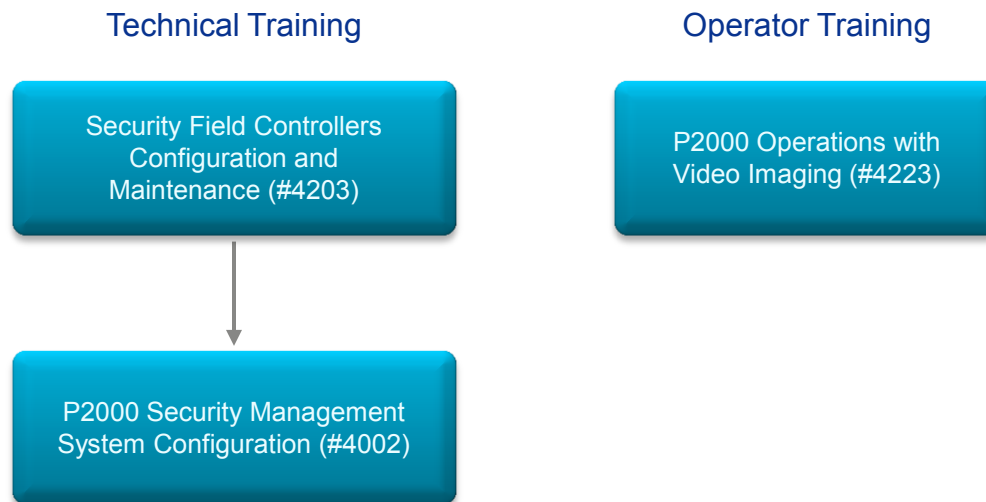
For End Users and/or Authorized Building Controls Specialists/Contractors Only.



 [Enroll for this Course](#)

Typical Sequence of Courses for Security Solutions

 Click on a course to view its details.



Security Field Controllers Configuration and Maintenance

Course #4203, 1.3 CEU

This course covers operational theory, configuration and maintenance of the CK720, CK721 and S-300 Series Field Controllers and associated devices and terminals.

Course Topics

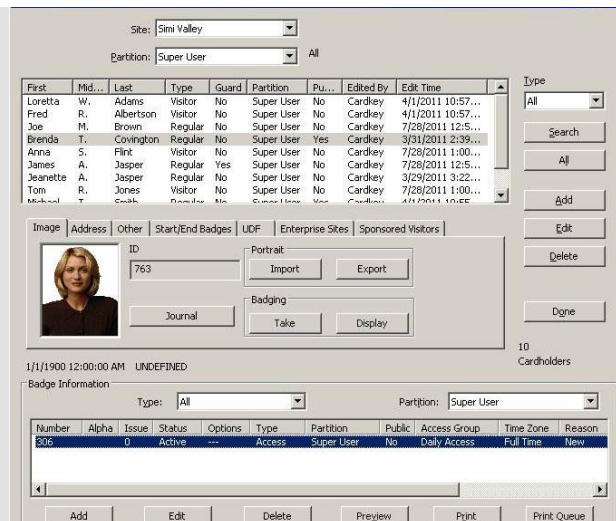
- Introduction and Software Installation
- Panel Communications and Configuring the System
- Time Zones and Holidays
- Panel Connections and Configuration
- Terminals, Outputs and Inputs
- Elevator Configuration, Terminal and Access Groups
- Custom Badge Designs
- Operating the System
- Report Generation
- Security Threat Level, Area Control, Events
- System Maintenance
- Hands-on Labs
- Final Review

Course Duration:

Wednesday–Thursday
Class ends at 3:30 p.m. on Thursday

Course Fee:

\$1270 per student



 Enroll for this Course

P2000 Configuration, Operation and Maintenance

Course #4002, 2.7 CEU

Students will learn the process to install, update and configure a P2000 system. They will also learn how to operate the software including alarm handling, badging and more.

Course Topics

- Introduction and Software Installation
- Panel Communications and Configuring the System
- Time Zones and Holidays
- Panel Connections and Configuration
- Terminals, Outputs and Inputs
- Elevator Configuration, Terminal and Access Groups
- Custom Badge Designs
- Operating the System
- Report Generation
- Security Threat Level, Area Control, Events
- System Maintenance
- Hands-on Labs
- Final Review

Course Duration:

Monday–Thursday
Class ends at 3:30 p.m. on Thursday

Course Fee:

\$1670 per student

Recommended Prerequisites:

Security Field Controllers Configuration and Maintenance (#4203) and Building Automation System (BAS) Networking (CBT7500)



 [Enroll for this Course](#)

P2000 Operations with Video Imaging

Course #4223, 1.3 CEU

This course provides both new and veteran P2000 operators and administrators with the skills necessary to successfully administer and operate a P2000 Access Control System with video imaging.

Course Topics

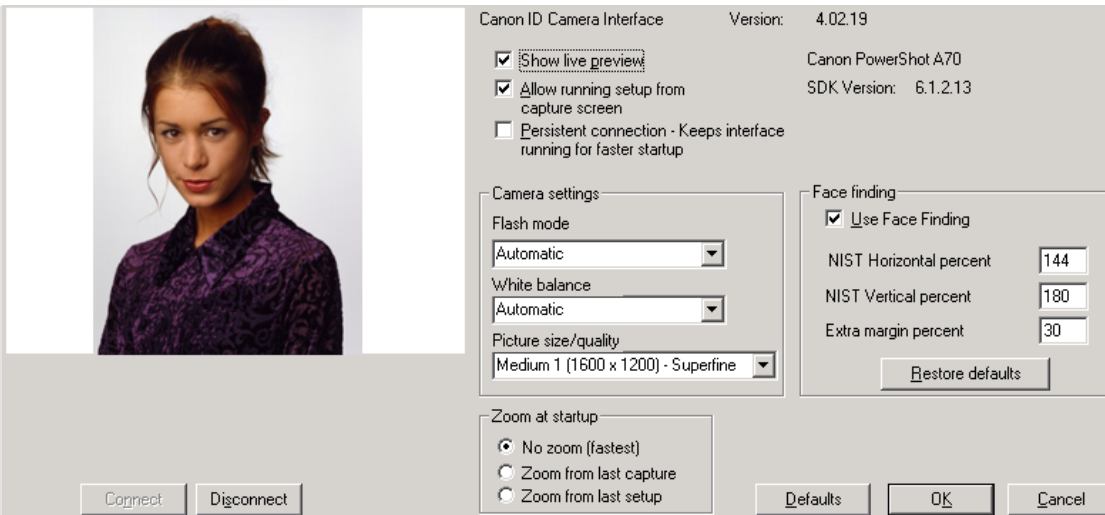
- System Overview
- System Shutdown/Startup
- Logging into the System
- Basic System Configuration
- Real Time List
- System and Operator Permissions
- Event Action and Trigger Configuration
- System Backup
- Responding/acknowledging Alarms and Maps
- Door Output Control
- Cardholder Creation and Deletion
- Image Recall
- Running Reports
- Hands-on Labs
- Final Review

Course Duration:

Monday–Tuesday
Class ends at 3:30 p.m. on Tuesday

Course Fee:

\$1270 per student



Canon ID Camera Interface Version: 4.02.19

Show live preview
 Allow running setup from capture screen
 Persistent connection - Keeps interface running for faster startup

Canon PowerShot A70
SDK Version: 6.1.2.13

Camera settings

Flash mode: Automatic

White balance: Automatic

Picture size/quality: Medium 1 (1600 x 1200) - Superfine

Face finding

Use Face Finding

NIST Horizontal percent: 144

NIST Vertical percent: 180

Extra margin percent: 30

Restore defaults

Zoom at startup

No zoom (fastest)
 Zoom from last capture
 Zoom from last setup

Connect Disconnect Defaults OK Cancel

 [Enroll for this Course](#)

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.

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 Labs
- Final Review

Course Duration:

3 days

Course Fee:

\$950 per student

Recommended Prerequisites:

FX 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

Network Inputs	Setpoint/Miscellaneous	State Generation
AUTOCAL-C	Autocalibrate Now LV	Water System Flush Pass...
FLUSHPOS	Minimum Flow Determinati...	PID Tuning Reset
HTG-EN	Occupancy Mode Determin...	Autocalibration Sequence...
OCC-SCHEDU...	Supply Area LV	Balancer Override SD
SA-T	Supply Damper Stroke Time	Box Flow Test

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



Enroll for this Course

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.

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.

Course Duration:

3 days

Course Fee:

\$950 per student

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.

 [Enroll for this Course](#)



Metasys® User Interface Overview

Course #3003

Metasys® User Interface (UI) Overview is a distance learning course designed to introduce the new functions and features of the Metasys® UI. Through an explorative interactive study, participants will gain an insightful, useful understanding of the UI layout, navigation, and help resources. This course is geared towards users interested in learning the new UI.

Course Topics

- Logging in and out of the Metasys® UI
- Use Help and the Take a Tour features for continuous learning
- Navigate the Metasys® UI using Spaces and Equipment
- Use Spaces to identify operational statuses
- Use Equipment to identify status of points
- Commanding and viewing Trends
- Identify and respond to Alarms
- Utilize the Widgets to obtain details of space and equipment points

Course Duration:

6 Hours

Course Fee:

\$395 per student

Recommended Prerequisites:

None



[Enroll for this Course](#)

Configuring the Metasys® UI Database

Course #3004

This one-day distance learning internet course teaches building personnel how to configure the Metasys® UI Database using System Configuration Tool (SCT) software. This course is for building personnel who have the responsibility for creating and editing that database that will be used in the Metasys® UI.

Students will receive an email, from the course Instructor, one week before the class. This email will contain the internet connection information (WebEx collaboration software will be used) and Phone Conference connection information. Also included in this email, will be the SCT Archive image files and installation instructions into the Student's SCT computer prior to the course. (Contact your local JCI representative if you are not confident in importing Archive databases into SCT.)

Course Topics

- Overview SCT operation
- Overview Metasys® UI operation
- SCT Help File System
- Creating Spaces in SCT
- Creating Equipment in SCT

Course Duration:

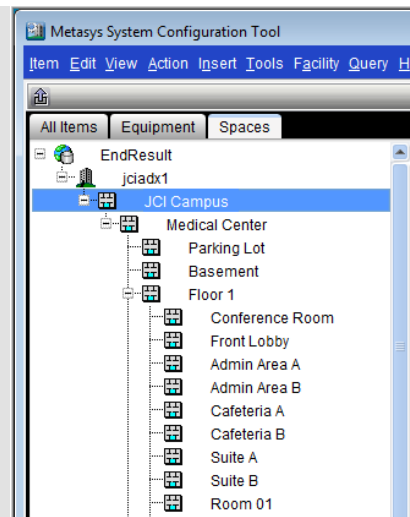
6 Hours

Course Fee:

\$395 per student

Computer Prerequisites:

- Students will be using their computers with SCT Version 7.0 or greater installed
- Students will need to have the supplied two Archive images installed in their SCT
- Internet connection on the student's computer
- Phone conference connection



 [Enroll for this Course](#)

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.

YS/YR Rotary Screw Chillers

Course #2105, 2.0 CEU

Students will learn about all components related to system operation and maintenance, including compressor capacity control, setup and navigation of the OptiView Control Center, and other system ancillaries. This course includes hands-on training using OptiView Control Panel simulators. A comprehensive review of the preventive maintenance schedule and system capacity checkout further enhances the student's total understanding of unit operation, maintenance and troubleshooting.

Metasys® LN ASC Operations

Course #4600, 2.0 CEU

Take control of your facility equipment by programming your own control strategies for Metasys® LN ASC Controllers. Participants will learn LON network terminology and setup, how to load the MCL tool software, as well as commission LN ASC Controllers.

Airside System Analysis

Course #4706, 2.0 CEU

Students will learn how to analyze the current operation of their heating, cooling, humidification and dehumidification air distribution system. They will also learn how to locate airside system problems, find solutions as well as fine-tune their building HVAC system for the highest degree of comfort while simultaneously decreasing operating cost. Many practical air system related topics are covered including determining the current operating capacity of a system, adjusting the system for optimum comfort and lowest operating cost, resizing blower motors for energy savings and much more.

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Facility Explorer® (LX) Field Controllers Engineering and Setup

Course #4712, 3.0 CEU

Students will learn how to create their own LonWorks Facility Explorer® application programs using Facility Explorer® and the LX Wizards.

Recommended Prerequisites:

Fundamental Control Strategies for HVAC Systems (#215) or a strong knowledge of HVAC systems and control strategies, **and** Facility Explorer® (FX) Supervisory Controllers Engineering and Setup (#4701)

LonWorks Orientation for Building Operators

Course #4715, 0.7 CEU

This one-day course teaches building personnel the basics of LonWorks control system. This course is for building personnel who need to have Basic LonWorks knowledge, no matter what system they are using.

Metasys® Learning Track Concentrations

In a world of ever-increasing technology, it is essential that everyone maintain a high level of knowledge relating to his or her line of work. At the Johnson Controls Training Institute, we understand this and are working to keep you at the forefront of the industry. We are excited to offer three programs designed to make you a more valuable asset to your team.

The benefits to business include:

- Better Qualified Employees
- Rapid Problem Resolution
- A Self-reliant Workforce
- Less Expensive Training per Class

The benefits to the technicians include:

- Increased Job Skills
- Preplanned Personal Growth

Different people have different needs so we offer concentrations in Metasys® Operation, Metasys® Troubleshooting and Maintenance, and Facility Engineering.

Upon successful completion of at least four courses within a Learning Track Concentration in a five-year period, you will be awarded a plaque which denotes the level of your achievement.



Metasys® Learning Track Concentrations



Click on a course to view its details.

Metasys® Operations Concentration

Course #	Course Title
210	HVAC Mechanical Systems
215	Fundamental Controls Strategies for HVAC Systems
***	Any Metasys® Facility Operator Course: 388 , 389
381	Metasys® HVAC ASC Operations/Troubleshooting
365	Metasys® DX-9100 Operations/Troubleshooting
4703	Metasys® FEC Operations/Troubleshooting

Metasys® Troubleshooting and Maintenance Concentration

Course #	Course Title
***	Any Metasys® Facility Operator Course: 388 , 389
381	Metasys® HVAC ASC Operations/Troubleshooting
365	Metasys® DX-9100 Operations/Troubleshooting
4703	Metasys® FEC Operations/Troubleshooting
4718	Metasys® extended architecture Hardware and Troubleshooting

MSEA Facility Engineering Concentration

Course #	Course Title
***	Any Metasys® extended architecture Course: 388 , 389
353	Metasys® HVAC ASC Engineering
364	Metasys® DX-9100 Engineering
391	Metasys® system extended architecture Engineering and Setup
3002	Metasys® Graphics Generation Tool
4707	Metasys® FEC Systems Engineering
4704	Metasys® FEC Custom Programming
4718	Metasys® extended architecture Hardware and Troubleshooting

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.

Computer-Based Training

Use the power of a computer to enhance your knowledge of building environments or variable air volume systems, or to build your skill in using the Metasys® Operator Workstation. Interactive computer-based training programs provide an engaging learning experience, the opportunity to demonstrate your knowledge and skills and immediate feedback of your performance.

- **Building Automation Systems**
- **Heating, Ventilating and Air Conditioning Systems**
- **Preventative Maintenance**
- **Automated Building Controls**
- **Security**

Written Material

Sometimes we need to “see it on paper” in order to believe it...the Johnson Controls Training Institute offers a wide range of written materials for learners. Many of our workbooks contain hands-on lab activities for you to complete using your own equipment, in your own facility.

Discounts

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



Learning Packages

HVAC Introduction (LM17)

Explore the fundamental concepts, theories and principles of the building environment industry in this comprehensive introduction to HVAC systems and controls. (©2015 Johnson Controls, Inc.)

Price: \$195.00

Topic Outline

- Environment – Temperature, Humidity, Air Movement, Air Purity
- Systems – Heating Plant, Cooling Plant, Distribution Systems, Terminal Systems
- Controls – Control System Components, Classification, Typical Control Loops



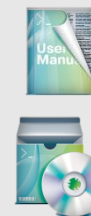
HVAC System Types (P55)

Color animated graphics and views of actual HVAC system components provide an in-depth study of the ASHRAE classifications. (©1991 Johnson Controls, Inc.)

Price: \$195.00, Additional Workbooks: \$24 each, \$200 for ten

Topic Outline

- All Water Systems – One Pipe Systems, Two Pipe Systems, Four Pipe Systems, Unit Ventilator
- All Air Systems – Single Path, Dual Path, Variable Air Volume, Air and Water Systems, Room Control, Return Air Control, Discharge Control
- Air Water Systems



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: \$75.00

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 Hydronic Systems
- Air Cleaning Equipment, Fans, Ducts, Humidifiers
- Control Strategies for Occupant Comfort
- Advanced Technology for Effective Facility Control



Application, Installation and Operation of Controls for Commercial Comfort Systems (C-3100-EN)

This three-part, computer-based course builds knowledge and skill in both the application and installation of controls for Commercial Comfort Systems. (©2008 Johnson Controls, Inc.)

Price: \$99.00

Topic Outline

- Commercial Comfort System Control Components
- HVAC Systems Types
- Zoning Design Considerations
- Planning a System Installation
- Layout of Control and Network Devices
- Mounting Devices
- Wiring Considerations
- Terminating
- Addressing Controllers
- Balancing – Operations



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: \$30.00

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
- Sequential Control



Building Automation System (BAS) Networking (CBT7500)

Build your knowledge, comprehension and vocabulary about basic networking concepts and terminology. (©2003 Johnson Controls, Inc.)

Price: \$195.00

Topic Outline

- Network architecture, Devices, Addressing
- Metasys® Products Functioning on Networks
- Cabling
- Hubs, Repeaters, Switches, Bridges, Routers
- Remote Access Options
- Gateway Integration Devices



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 or contact our Facility O&M Development professionals at 800-524-8540.



Facility O&M Workforce Assessments and Development Solutions

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
- General Trades Workers & Custodians
- 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, onsite coaching, project assignments, O&M strategy updates, process improvements, organization updates, rewards, new equipment, and performance support tools.

How to Enroll in a Course



Enroll Online

Register and purchase trainings online with credit cards, all at one location.



View Our Course Schedule

Check classes that are open for enrollment and check the current status of a class.



Browse Courses

Visit www.jci-training-institute.com for new classes and special discounts.

Johnson Controls Training Institute: Course Application

We encourage you to register for classes online at: www.jcittraininginstitute.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 State Zip

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 course.

****Early Payment Discount does NOT apply to any voucher payments or distance learning.****

5-Pack 10-Pack Personal Passport 3-Pack Course Vouchers: See page 9 for details

Payment Method Selected:

Visa® or MasterCard® or American Express®

Exp. Date

(Signature)

(Email address to send receipt)

Check for \$_____ (in U.S. Currency), payable to Johnson Controls Training Institute.

Please attach check and application form together. Note: current prices may change.

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 fourteen 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.

Johnson Controls Training Institute: Learning Packages Order Form

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Payment must be received prior to shipment.

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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 this 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.)
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LM/Pkg/CBT Number	Title / Description	Quantity	Total Price
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		(U.S. Dollars)	
		Total	



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.)



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or email us at: cg-customer.registrar@jci.com

