



International Union of Operating Engineers

2019 Stationary Training Course Schedule

Course	Instruction Days	Dates
Emergency Generator O & M	3	January 15-17
Chiller Efficiency	3	January 29 - 31
Torches and Tubes for Stationary Engineers	3	February 5 - 7
Building Automation Systems	4	February 19 - 22
BACnet for Stationary Engineers	3	February 24 - 26
HVACR Instructor Train the Trainer	2	March 12 - 13
Infectious Control Risk Assessment & Containment for Hospitals and Healthcare Facilities	2	March 13 - 15
PLC Programming, Installation & Troubleshooting	3	March 26 - 28
Variable Frequency Drive Operation and Building Electrical Troubleshooting Skills	3	April 8 - 10
Air & Hydronic Testing and Balancing	3.5	April 9 - 12
Boiler System Efficiency	3	April 30 – May 2
Thermography and Vibration Analysis	2	May 7 - 8
Lighting Technology & Efficiency	1.5	May 15 - 16
Variable Frequency Drive Operation and Building Electrical Troubleshooting Skills	3	June 25 - 27
Johnson Controls Products	3	June 18 - 20
Pump Maintenance	4	July 18 - 21
Chief Engineer/ Facility Management Seminar	5	July 29 - August 2
Chiller Efficiency	3	July 30 - August 1
Mission Critical Seminar	2	August 14 - 15

Revised schedules will be sent out periodically as courses are added throughout the year.



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Course	Instruction Days	Dates
PLC Programming, Installation & Troubleshooting	3	August 20 - 22
Photo Voltaic Class	2	September 4 - 5
Thermography and Vibration Analysis	2	October 1 - 2
Facility Water Chemistry & Wastewater Treatment	4	October 1 - 4
Boiler System Efficiency	3	October 15 - 17
Pump Maintenance	4	November 7 - 10
Torches and Tubes for Stationary Engineers	3	November 12 - 14
Air & Hydronic Testing and Balancing	3.5	December 2 - 5

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AIR AND HYDRONIC TESTING & BALANCING TRAIN-THE-TRAINER

This seminar is designed to enhance an engineer's air and hydronic balancing skills. Students will become familiar with the proper tools, instruments, and common methods of transferring air and water through a facility.

BACNET PROTOCOL COURSE SUMMARY

The 3-day course demonstrates the flexibility of the BACnet Protocol. The course reviews the components of the protocol (PIC statements, BIBBs, BACnet profiles, etc) and explains the functionality of each component. Through multiple examples and hands-on labs, the student pulls and pushes data to and from multiple devices utilizing various protocols and data visibility across multiple platforms. Labs and exercises will also demonstrate the utilization of various datalinks including: BACnet/IP, BACnet/MSTP, and BACnet/Ethernet. Course strengthens the understanding and functionality of BACnet routers, bridges, and gateways, and includes customizing GUI, HI and HMI displays. The course remains Vendor neutral and concentrates on Data Management.

BOILER SYSTEM EFFICIENCY

This course is designed to assist in the education and development of the individual who has the responsibilities for the day to day operation and maintenance of their boiler and the ancillary equipment. This individual will gain the knowledge and understanding of how to properly operate the equipment safely and more efficiently. This course will also provide the proper sequence of operation or timing that will assist in the troubleshooting area and reduce downtime and increase reliability. The program includes plant tours to reinforce lessons learned.

BUILDING AUTOMATION SYSTEMS

This seminar is designed to introduce the engineer to Direct Digital controls, various types of Building Automation Systems and a review of Basic Control Theory and Control Sequences. It covers terminology, principals, and applications of direct digital controls (DDC) & automation systems for HVAC monitoring and control. Some of the topics include Interfacing Sensors & Actuators, Microprocessor Fundamentals, Programmable Controllers, Programming Basics, DDC programming Applications, DDC Automation & Design. Students will also gain knowledge on how to troubleshoot and perform tests on DDC control systems such as thermostats, transmitters, actuators, controllers etc. Students will also learn how to properly diagnose, repair and setup Building Automation Systems for ideal comfort and energy savings. There will also be a discussion of the assortment of instruments available for working with DDC controls.

CHIEF ENGINEER/FACILITY MANAGEMENT SEMINAR

This Seminar is designed for chief engineers or engineers training to make the transition to chief or lead engineer. This seminar will provide the student the necessary administrative and personnel skills to handle the day-to-day leadership challenges associated with this position. The ten sections are: Recommended Skills levels, Planning and Time Management, Budget Preparation, Computer Applications, Record Keeping, Benefits of an Internal Work Force, Reports and Presentations, Health and safety, Human Relations, and Energy Conservation.



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CHILLER EFFICIENCY

Chillers can be one of the largest energy users in a facility. This seminar provides an overview of the fundamentals of several types of chillers and how they function. It also reviews the controls of popular chiller interfaces and what to look for when monitoring them to help ensure they are running at their peak efficiency. Students have the opportunity to work with one of the three chillers in the training center which include Carrier, Trane, and York chillers.

COOLING TOWER-OPERATION/ MAINTENANCE

This seminar is focused on the care of evaporative cooling equipment. The course provides useful information about how to operate equipment for optimal performance and reliability. Students will learn the design of cooling towers. It covers water quality, water flow balance, water quantity, fill condition, fan systems, and overall maintenance.

EMERGENCY GENERATOR OPERATIONS & MAINTENANCE

This is a journey level class for both “theory and practical” knowledge on diesel generator operation. The seminar will have three primary categories:

- 1) Diesel generator maintenance and operation
- 2) Safety with emphasis on OSHA standards, Title 29 1910 & 1926 Code of Federal Regulations
- 3) Basic electrical knowledge as per National Electrical Code guidelines

Students will have hands on time with a diesel generator package.

FACILITY WATER CHEMISTRY & WASTEWATER TREATMENT

Formally named Water Treatment, this seminar covers the chemistry behind plant water treatment programs and how it helps ensure that water systems are safe from scale, corrosion, oxygen, carryover, and other issues. Hands on training of actual plant water systems at the training center will also be included. An added day of training is provided for wastewater treatment.

HVACR INSTRUCTOR TRAIN THE TRAINER

Instructors only – HVACR is foundational for stationary engineers. The two new courses HVACR1 & HVACR2 teach students how these critical systems function, better preparing them for the practical skills they’ll learn on the job. The course is delivered in an entirely new format with enhanced technology. Instructors who teach these courses will benefit greatly from attending this train-the-trainer seminar. Instructors will learn how to take advantage of the many new teaching tools this format provides. They’ll also learn how the course can be used to powerfully combine face-to-face training with online supplemental learning. The project lead, Rissa Karpoff, will be joining us on-site to facilitate the seminar.

INFECTIOUS CONTROL RISK ASSESSMENT & CONTAINMENT FOR HOSPITALS AND HEALTHCARE FACILITIES

In healthcare settings, an engineer’s work tasks can have a direct impact to patients and workers. In this class students will learn the latest best practices in these critical environments. Topics include containment and assessments for repairs and renovations as well as negative air machines and calculations for same. Students will obtain hands on training with erecting containment structures and utilizing negative air machines.



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INDOOR AIR QUALITY FOR HOSPITALS (ICRA)

Health care-associated infections, or HAIs, are infections that people acquire while they are visiting a hospital or receiving treatment for another condition in a health care setting. This seminar teaches engineers how to perform Infection Control Risk Assessments (ICRA) as well as provide hands on training in the latest work area isolation equipment. Students get hands on training in using zip walls, mobile dust containment, and negative air machines.

JOHNSON CONTROLS PRODUCTS

The 3-day course concentrates on legacy and current Johnson Control products. The course includes: VAV, Unitary, and Digital Extension Modules (DX) devices, HVAC PRO and GX9100 configuration tools, and Visio Graphic tools; Controller Configuration Tool (CCT) and the Graphic Generation Tool (GGT), and the most current Metasys UI tool. The course provides frequent labs and demonstrates to increase a students understanding and functionality of Johnson Controls products. However, basic product familiarity will be helpful.

LIGHTING TECHNOLOGY & EFFICIENCY

This seminar is designed to teach the various lighting systems used in facilities and discuss upgrades for better lighting and energy savings. It reviews lighting quality, quantity, heat, effects on electrical consumption and other factors useful when considering the lighting needs of a facility.

MISSION CRITICAL

This seminar is lecture based and designed as an introduction or overview for the Engineer to various types of Mission Critical Systems in the Data Center Environment. The seminar will begin with how a data center operates followed by how and why data centers have evolved into what they are today. The remainder of the seminar will be more advanced discussions relating to the equipment and how the equipment operates to promote a 24/7 Data Center Operation including an introduction to basic preventative maintenance of critical equipment.

PHOTO VOLTAIC SYSTEM TROUBLESHOOTING

This course work will include information on site location, system sizing, mounting options, system components, configurations, mechanical, electrical integration and code requirements.

Topics also include Solar Radiation, System Components, Cells, Modules, and Arrays, Batteries, Inverters, System Sizing, Mechanical Integration, Electrical Integration, Utility Interconnection, Permitting and Inspection, Commissioning, Maintenance, and Troubleshooting

PROGRAMMABLE LOGIC CONTROLLER (PLC)

This course is intended to instruct stationary engineers on the basics of programmable logic controllers. It covers basic programming of some of the most common equipment in the industry, basics needed for configuring and troubleshooting devices on a network, and industry best practices for installing and maintaining these systems. It will provide students with the tools needed to install and program PLCs. It will also orient students on methods of networking and troubleshooting SCADA systems and familiarize them with terminology and methods so that they can adapt these lessons to their facility's equipment.



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PUMP MAINTENANCE

The successful and efficient operations and maintenance of any mechanical system can only be accomplished with a clear understanding components that make up the mechanical system and how they interact with each other. In the field of stationary engineering, engineers are responsible for the operations and maintenance of systems such as the Chilled Water, Condenser Water and Hot Water systems to just name a few. The heart of each of these is the pump.

In this course students will become familiar with different types of pumps, their operating principles, how to diagnose and troubleshoot issues, and their proper maintenance and repair procedures.

ROOFTOP HVAC TROUBLESHOOTING & MAINTENANCE

Light commercial HVAC units on roofs are the topic of this seminar. Learn all aspects of working in this environment and on these units. This is designed for maintenance and service engineers and provides a concentration troubleshooting best practices.

TEACHING TECHNIQUES I

The Basic Teaching Techniques course is designed especially for part-time, new or recently hired instructors. The course presents useful introductory concepts and also requires actual practice teaching with constructive feedback.

It is conducted over a 4-½ day period. It will provide instructors with all materials and demonstrate various teaching techniques for classroom application. It meets the U.S. Department of Labor requirements for instructor training.

TEACHING TECHNIQUES II

PRE-REQUISITE: Teaching Techniques I and basic computer skills

The Intermediate Teaching Techniques course is a new component of the IUOE Master Instructor curriculum. This course is designed for instructors with previous classroom teaching experience. It builds on introductory concepts and covers multi-media technologies including PowerPoint presentations and the NTF's Blackboard online education system.

THERMOGRAPHY AND VIBRATION ANALYSIS

Two important tools of our trade will be covered in detail. Get hands on training using the latest Fluke Thermal Imagers for testing and troubleshooting. Thermal imagers give engineers insights into how equipment is actually running and can identify problems before component failure occurs. The vibration analysis portion gives students hands on training to test the alignment and vibration of pumps and motors. Plant tours and hookups to actual plant equipment is also provided.

TORCHES AND TUBES FOR STATIONARY ENGINEERS

Every facility has tubes and pipes for various systems including plumbing, HVAC, fuel lines, and sprinklers. Students will work with various pipes including copper plumbing, copper refrigeration, black iron, brass, and others. With much hands on, learn how to braze, sweat, heat, swedge, and thread. This seminar includes destructive testing and time allowing, will also include arc welding.



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VARIABLE FREQUENCY DRIVE OPERATION AND BUILDING ELECTRICAL TROUBLESHOOTING SKILLS

This three-day seminar is designed to provide the knowledge and skills required when selecting, installing, testing and troubleshooting VFDs, the motors they control, and the control circuits connected to them. In this hands-on seminar, students will build, program and test VFD, motors and control circuits. Test instruments covered and used include digital multi-meters (DMMs), current clamps, power quality analyzers, and meter attachments.

Topics, circuits, and equipment covered include:

- Test instrument terminology, symbols and measurement functions for each type of instrument used is covered to learn what test instruments should and should not be used on VFD circuits
- Learn the safe and correct way to take electrical measurements and what the measurements actually mean.
- Learn where and how to use special meter functions like MIN/MAX, RELATIVE, LoZ, Peak, kVA, kW, and PF measurement functions.
- Learn how to test for grounding problems.
- Understanding VFD and motor nameplate data.
- Learn how to test and wire any three-phase motor without using the motors wiring diagram and what the expected readings should be before power is applied and how to troubleshoot the motor after power is applied.
- Circuits built include using, magnetic motor starters (to understand moving from mechanical starters to VFDs), mechanical and solid-state switches, such as, selector switches, proximity switches, photoelectric switches, analog inputs (photovoltaic and potentiometers), and other commonly used electrical devices.
- Connect, program, and test two different types of VFDs (variable frequency drives).
- VFD related system control functions such as timers, mechanical and solid-state relays, and PLCs will also be covered, connected, and tested.
- Take power measurements (P.F., kVA, kW, and harmonic) to understand power quality problems in VFD controlled systems.



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ATTENDEE REGISTRATION FORM

All areas of this registration form **MUST** be completed and legible.

Your Local Union Business Manager **MUST** approve and sign this form.

Please note: You will receive all future correspondence regarding this course/event via e-mail.

NAME OF COURSE/EVENT: _____

COURSE/EVENT DATES: _____

ATTENDEE INFORMATION

NAME: _____ **EMAIL:** _____

CELL PHONE NUMBER: _____

LOCAL UNION: _____ **UNION REGISTER NUMBER :** _____

REGION: Northeast North/Central Canada Southern Western

Attendee Signature

Date

AUTHORIZATION

I authorize this member to attend the above listed course/event at the IUOE Training & Education Center in Crosby, Texas.

Business Manager Signature

Date

Print, sign, and either Fax (281) 666-1459 or email ahensley@iuoe.org.

**This form must be filled out on your computer. No hand written forms will be accepted.
Please submit a separate form for each course/event you would like to attend.**

Submission of this form does not guarantee admission to the course/event. You will receive a letter to let you know you have been enrolled in the course/event. This letter will also provide you with instructions on how to make travel arrangements and other important information.

Updated 7/3/2018