International Union of Operating Engineers

AFFILIATED WITH THE AMERICAN FEDERATION OF LABOR AND CONGRESS OF INDUSTRIAL ORGANIZATIONS

Training Course Schedule

Courses from June 15, 2025 - August 14, 2025

Course - Session	Date(s)
Testing & Balancing for Air & Hydronic Systems	Jun 11, 2025 - Jun 15, 2025
HVAC Systems 1	Jun 16, 2025 - Jun 20, 2025
Low Pressure Boiler Operations	Jun 16, 2025 - Jun 20, 2025
Crane Operations - Intro To Luffing Crawler Crane Operations	Jun 17, 2025 - Jun 21, 2025
Crane Operations - Practical Testing for NCCCO Certification	Jun 17, 2025 - Jun 21, 2025
GPS Training for Instructors Only	Jun 17, 2025 - Jun 19, 2025
Electrical Troubleshooting & Variable Frequency Drive Operations	Jun 19, 2025 - Jun 22, 2025
Chiller Efficiency	Jun 19, 2025 - Jun 21, 2025
Blueprint Reading II for Stationary Engineers	Jun 22, 2025 - Jun 26, 2025
Electrical Systems 2	Jun 23, 2025 - Jun 27, 2025
Crane Operations - Level 1 Crane Operations for Beginners	Jun 23, 2025 - Jun 27, 2025
Excavation Operations	Jun 23, 2025 - Jun 27, 2025
Welding	Jun 23, 2025 - Jun 27, 2025
Crane Operations - Liebherr 81K.1 Fast Erecting Tower Crane Assembly/Disassembly	Jun 23, 2025 - Jun 27, 2025
Basic Controls and Building Automation Systems	Jun 28, 2025 - Jun 30, 2025
Electrical Troubleshooting & Variable Frequency Drive Operations	Jul 1, 2025 - Jul 4, 2025

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Automated Lighting Controls by Lutron Electronics	Jul 7, 2025 - Jul 8, 2025
OSHA 503 Update for General Industry Outreach Trainers	Jul 7, 2025 - Jul 9, 2025
Crane Operations - Practical Testing for NCCCO Certification	Jul 8, 2025 - Jul 12, 2025
Motorgrader Operations	Jul 8, 2025 - Jul 11, 2025
Electrical Systems 1	Jul 9, 2025 - Jul 13, 2025
OSHA 502 Update for Construction	Jul 10, 2025 - Jul 12, 2025
Pump Maintenance & Operation	Jul 14, 2025 - Jul 17, 2025
HVAC Systems 2	Jul 14, 2025 - Jul 18, 2025
Data Center Operations	Jul 14, 2025 - Jul 18, 2025
OSHA 521 Industrial Hygiene	Jul 14, 2025 - Jul 18, 2025
Boiler Operations 1	Jul 17, 2025 - Jul 21, 2025
NATE Test Prep	Jul 20, 2025 - Jul 22, 2025
Electrical Systems 2	Jul 21, 2025 - Jul 25, 2025
Crane Operations - LMI Setup & Crane Operations	Jul 21, 2025 - Aug 1, 2025
Excavation Operations	Jul 21, 2025 - Jul 25, 2025
Mechanics Training - Tier 4 Diesel Engine Air Induction & Emissions Control	Jul 21, 2025 - Jul 25, 2025
Basic Controls and Building Automation Systems	Jul 26, 2025 - Jul 28, 2025
Energy Conservation	Jul 26, 2025 - Jul 29, 2025
Electrical Troubleshooting & Variable Frequency Drive Operations	Aug 1, 2025 - Aug 4, 2025
Chiller Efficiency	Aug 2, 2025 - Aug 4, 2025

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Training Course Schedule

Advanced Controls & Building Automation Systems	Aug 2, 2025 - Aug 4, 2025
Crane Operations - Practical Testing for NCCCO Certification	Aug 4, 2025 - Aug 8, 2025
Excavation Operations	Aug 4, 2025 - Aug 8, 2025
Data Center Operations	Aug 5, 2025 - Aug 9, 2025
Stationary Training Conference	Aug 5, 2025 - Aug 6, 2025
High Pressure Boiler Operations	Aug 6, 2025 - Aug 10, 2025
Electrical Systems 2	Aug 11, 2025 - Aug 15, 2025
Pump Maintenance & Operation	Aug 11, 2025 - Aug 14, 2025
Welding	Aug 11, 2025 - Aug 15, 2025
Crane Operations - Level 1 Crane Operations for Beginners	Aug 11, 2025 - Aug 15, 2025
GPS Training for Instructors Only	Aug 12, 2025 - Aug 14, 2025

Training Course Descriptions

TESTING & BALANCING FOR AIR & HYDRONIC SYSTEMS

HVAC system efficiency and human comfort are all affected by proper system airflow requirements. Testing, Adjusting, and Balancing (TAB) of an HVAC system is a useful process of measuring and regulating the amount of airflow at each area of the building. Balancing is essential for any HVAC system to perform as per building design and expectations. It is an overall health check for your HVAC system and helps to ensure that you are providing the building occupants with a comfortably conditioned space at the lowest energy cost possible.

A well-balanced system will ensure the right amounts of air are delivered to the right places, at the right temperature, and humidity levels with the least amount of distribution losses. It is important that the air distribution system and duct designs are designed and installed in such a way that the balancing and the measuring of airflow are possible and can be performed accurately.

This course will discuss why balancing an HVAC system is so important, why systems become unbalanced, what the balancing process entails and more. This course will help the student understand the TAB process and interpret the ventilation/balance report information and the process for conducting total system balancing, from start to finish, for basic air systems, hydronic systems, and domestic hot water systems found in commercial buildings. Course topics include document review & preparation for TAB (of air & water systems), site observations, testing for constant & variable air & water system flow rates.

HVAC SYSTEMS 1

Heating Ventilation Air Conditioning and Refrigeration are core topics for Stationary Engineers.

This course is designed to give students an solid understanding of HVACR. After taking this class students will have:

- Knowledge of fundamental refrigeration principles.
- Knowledge of fundamental HVAC principles.
- Knowledge of HVAC system components.
- Knowledge of HVAC control systems.
- Understand air comfort and quality.
- Ability to solder and braze connections for piping systems.

This course includes hands on training with state of the art tools and equipment.

LOW PRESSURE BOILER OPERATIONS

Low Pressure Boiler Operations course will help to assist in preparing the Stationary Engineer for the proper operation of Low-Pressure boilers and will also help with preparing for the facility operating engineer licensing. This course provides a comprehensive overview of the latest information on the safe and efficient operation of low-pressure steam and hot water boilers, cooling systems, and related equipment. The course is divided into sections to aid comprehension of key concepts:

- Boiler Operation Principles
- Steam Boiler Fittings
- Steam Boiler Feedwater Systems
- Steam Systems
- Fuel Systems
- Draft Systems
- Boiler Water Treatment
- Boiler Operation Procedures
- Hot Water Boilers and Fittings
- Hot Water Boiler Accessories and Piping Systems
- Cooling Systems
- Boiler Operation Safety
- Boiler Operator Licensing

CRANE OPERATIONS - INTRO TO LUFFING CRAWLER CRANE OPERATIONS

Intro to Luffing Crawler Crane Operations - This course is for students with previous crane experience. The course will introduce operators to the procedures for raising and lowering luffing boom systems as well as their operation. It will cover what critical boom-to-luff angles are and where to find them. It will also cover how luffer charts differ from other charts.

CRANE OPERATIONS - PRACTICAL TESTING FOR NCCCO CERTIFICATION

Practical Testing for NCCCO Certification - Please remember when registering for this course that you should have prior experience in crane operations. The training portion of this course is only an equipment familiarization period on the crane or cranes you would like to be tested on. Members will complete a NCCCO application when the course begins and all candidate testing fees are the responsibility of the candidate.
Practical Testing available on the following cranes

- Lattice Boom Cranes
- Telescopic Boom Cranes—Swing Cab (TLL)
- Telescopic Boom Cranes—Fixed Cab (TSS)
- Tower Crane
- Overhead Crane

GPS TRAINING FOR INSTRUCTORS ONLY

GPS Training for Instructors Only - Courses are available to active IUOE Instructors only.

ELECTRICAL TROUBLESHOOTING & VARIABLE FREQUENCY DRIVE OPERATIONS

This four-day seminar is designed to provide the knowledge and skills required when selecting, installing, testing and troubleshooting electrical systems 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 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 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, 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 VFDs (variable frequency drives).

• Take power measurements (P.F., kVA, kW, and harmonic) to understand power quality problems.

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.

BLUEPRINT READING II FOR STATIONARY ENGINEERS

Prerequisite: Students should have taken Blueprint Reading for Stationary Engineers or have similar work experience and blueprint knowledge.

Printreading for Heavy Commercial Construction covers information on construction materials and methods, building process participants, project delivery methods, LEED® green building requirements, and the CSI MasterFormat®. Expanded topics in this class include project owner types, surveying, underground utility location, slip forms, building automation, interior trim, and new Energy Center prints.

Students will be also be exposed to various subjects related to MEP drawings on as large Commercial building specifications, Students will spend approximately 70% of classroom time with hands-on labs utilizing a variety of the drawings and specifications that are most often used as reference and guidance for the Stationary Engineer. Specific emphasis on owner branding, electrical, HVAC, and plumbing drawings and their use in the industry.

ELECTRICAL SYSTEMS 2

This class builds off of Electrical Systems 1 so students should have taken that before this class or have comparable experience and understanding.

In this class, students will be provided a greater understanding of electrical principles and theory including series and parallel circuits and more advanced electric formulas. Students will gain the ability to read electrical prints, replace breakers, and perform troubleshooting using Fluke meters. This course includes substantial hands-on activities.

CRANE OPERATIONS - LEVEL 1 CRANE OPERATIONS FOR BEGINNERS

Crane Operations for Beginners (Level 1) - In this class students will be taught the requirements for crane inspection, the basics of crane set up including LMI's and LML's. This portion of the class has a hands-on approach. The largest portion of the class will be actual seat time instruction in the "How To" operate a crane safely and build on basic skills necessary to lift loads.

EXCAVATION OPERATIONS

Excavation Operations – The IUOE Training and Education Center will be offering the Excavation Operations course for Operators with skill levels of beginner through advanced. This 40-hour course will include classroom instruction and hands-on training. Classroom instruction topics will include machine safety, working around utilities and OSHA regulations that apply to trenching/excavation activities. Hands-on will consist of machine control familiarization, benching and sloping techniques, slot dozing and backfill operations. Upon competition of this course, the member will understand trench safety techniques and how to move dirt efficiently.

WELDING

Courses will teach the student how to weld in all positions using different welding processes.

CRANE OPERATIONS - LIEBHERR 81K.1 FAST ERECTING

TOWER CRANE ASSEMBLY/DISASSEMBLY

Liebherr 81K.1 Fast Erecting Tower Crane Assembly/Disassembly - This course will cover the manufacturers procedures of erection, dismantle and climbing of the Liebherr 81K.1 Fast Erecting Tower Crane. Also covered is the inspection and setting of all safety limits. Students will gain hands-on experience of the controls for operating while erecting and dismantling the crane. During the multiple erect and dismantles of the crane during the week, changes in jib configuration will be performed. Load testing and programming of operational and load limits will also be performed.

BASIC CONTROLS AND BUILDING AUTOMATION SYSTEMS

BASIC CONTROLS& BUILDING AUTOMATION SYSTEMS

This course has been developed for individuals who want to take the mystery out of the understanding of how DDC controls and Building Automation Systems operate, and also the insight of the various related software packages that drive these systems and how they manipulate these systems.

This seminar has also been designed for people not familiar DDC controls and Building Automation Systems. There will be lectures on basic control strategies, the basics of DDC hardware, and also the basic understanding of building optimization for curtailing the use of energy.

For the experienced people there will be discussions on advanced control technologies dealing with the architecture of Building Automation Systems, discussing how they are installed, wired, and then programmed. Also, there will be main topic lectures on DDC Main Controllers, Stand alone controllers, and there communication protocols.

After the completion of this seminar the participants will be able to:

- Understand the basic DDC and Analog control technology for the HVAC field
- Describe the different types of control actions and when to use them
- Identify Building Automation System main components and where they are used
- Define and select the proper Automation System for different locations
- Ascertain how Building Automation Systems Operate to maintain human comfort
- Define the different types of Analog and Binary inputs and outputs
- Understand the system wiring though various schematic diagrams of installed systems
- Comprehend the different type of operator interfaces and how they communicate
- Define criteria for control strategies such as with closed loop control

- Describe control strategies and how buildings are optimized for peak efficiency
- Understand how a PID loop is written and how to tweak it in for the maximum performance
- Define the different types of programming method

AUTOMATED LIGHTING CONTROLS BY LUTRON ELECTRONICS

For Stationary engineers who wish to gain a better understanding of networked lighting control systems along with how to maintain and troubleshoot them.

Lutron's founder, Joel Spira, invented the first solid state electronic dimmer in 1959. Fast forward to the present day and the world of lighting controls has greatly advanced. In this class you will learn about the most popular commercial Lutron systems installed over the past decade. These products are found in hundreds of thousands of buildings across North America and the world. Commercial lighting systems will often fall under the purview of facilities management so a firm understanding of their maintenance ensures that the lighting system runs as smoothly as the rest of the building.

The duration of this course will be two days. It will act as a knowledge primer for the variety of commercial legacy Lutron systems a stationary engineer may find. We will also introduce the future of Lutron lighting controls and our newest commercial system.

Detailed topics will include:

- Online prerequisite learning plan introducing dimming technology and the Lutron story

- Instructor-led presentations relating to legacy Grafik Eye QS, Energi Savr Node, and panels
- Overview of Lutron's Vive and Quantum systems
- How to control the Quantum Vue Facilities Management software and use it in troubleshooting
- Work on a live Quantum system test wall, program and introduce faults in real-time
- Introduction to Lutron's newest cloud-connected solution, Athena
- Best Practices for Asset Management and Planning
- Update on Fluorescent to LED retrofit kits
- Tour of IUOE's Quantum Lighting Control System and software

OSHA 503 UPDATE FOR GENERAL INDUSTRY OUTREACH TRAINERS

OPEN TO IUOE INSTRUCTORS ONLY

RE-AUTHORIZES INSTRUCTOR TO TEACH: 10- and 30-Hour General Industry Outreach courses.

MOTORGRADER OPERATIONS

This course will focus on upgrading the skills for the Operating Engineer on Motorgrader operations.

ELECTRICAL SYSTEMS 1

Electricity is a fundamental part of most tasks that the stationary engineer performs. Whether one works with motors, chillers, boilers, air handlers, lighting, or controls, electricity plays a part of each. This course equips the stationary engineer with knowledge of electrical principals, electrical safety, how to perform electrical calculations, and gives an understanding of both AC and DC electrical components. Students have the opportunity to also perform hands on activities to reinforce the coursework.

This course is a suggested pre-requisite for Electrical Systems 2 course.

OSHA 502 UPDATE FOR CONSTRUCTION

OPEN TO IUOE INSTRUCTORS ONLY.

RE-AUTHORIZES INSTRUCTOR TO TEACH: 10- and 30-Hour Construction Industry Outreach courses.

PUMP MAINTENANCE & OPERATION

Successful and efficient operations and maintenance of any mechanical system can only be accomplished with a clear understanding of the components making up the mechanical system and how they interact. Stationary engineers are responsible for the operations and maintenance of 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 four-day 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. Focus is on hands on activities.

HVAC SYSTEMS 2

HVAC Systems 2 builds upon the students fundamental knowledge of heating, ventilation and air conditioning principles to teach the safe and efficient operation of systems found in facilities. Students completing the class will gain the following:

- Understanding of the operation of chillers, heat exchangers, pumps, fans and other system equipment.
- Understanding of the interaction between the different components in a system
- Understanding of HVAC control systems.
- Ability to perform basic HVAC system troubleshooting.
- Ability to safely handle refrigerants.
- Participate in practical hands on exercises to reinforce learning outcomes.
- Ability to pass a basic HVAC competency exam.
- Opportunity to take the EPA 608 exams.

Students taking HVAC Systems 2 should have previously taken HVAC Systems 1, or have knowledge of system components and core HVAC principles.

DATA CENTER OPERATIONS

Data Center Operation is a core skill for Operating engineers. This course will introduce the student to Data Center equipment found in mission-critical facilities where power supply and environmental control interruption is not acceptable. The program will cover an overview of the Data Center safety guidelines (OSHA 10, NFPA 70e), basic electrical theory and power distribution, switch gear operation, emergency generators, manual & automatic transfer switches, Uninterruptible Power Systems (UPS), battery types and handling procedures, Data Center specific HVAC equipment, chilled water systems, rules governing work in a Data Center, airflow management, fire risk mitigation and suppression, and general techniques used in these facilities. This will also include hands on exercises in our classroom Data Center simulation.

OSHA 521 INDUSTRIAL HYGIENE

OPEN TO IUOE INSTRUCTORS ONLY

AUTHORIZES INSTRUCTOR TO TEACH: Respiratory protection as a standalone course or as part of other courses, such as HAZWOPER.

MAIN TOPICS COVERED: Topics covered include terminology, OSHA Standards, NIOSH certification, respiratory protection programs, and medical evaluation recommendations.

BOILER OPERATIONS 1

The Boiler Operation 1 course is an introductory course that will provide stationary engineers and maintenance personnel a foundational understanding of boilers, steam and heating. Students will learn how boiler systems work, gain an understanding of boiler safety and learn about various boiler fittings and accessories. Upon completing the class, students will understand basic heat and steam principles, and know how to safely perform an inspection of an operating boiler.

NATE TEST PREP

North American Technician Excellence (NATE) is a non-profit certification organization for HVAC-R technicians. The ITEC is an official NATE Testing Organization.

The NATE Prep is offered at the ITEC is designed for journey level engineers who have knowledge of fundamental electrical, HVAC and refrigeration principles, as well as practical field experience. The 3-Day prep session will review electrical theory, safety, circuits, troubleshooting and formulas. The session will also review HVAC system components, system operations and maintenance, system controls, refrigeration principles and air conditioning troubleshooting. The review will assist students to take the NATE "Core" and "Air Conditioning and Heat Pumps" certification tests. Both tests will be administered during the 3-day session and students must pass both tests to achieve NATE certification. Information about NATE tests and the purchase of study guides can be found at natex.org. (https://natex.org/)

It is recommended to have and review both study guides prior to the session.

Core - NATE (natex.org) Air Conditioning and Heat Pumps - NATE (natex.org)

There is $140 fee to be paid by the student for each test. (Test pricing subject to change per NATE)

CRANE OPERATIONS - LMI SETUP & CRANE OPERATIONS

LMI Set-up & Crane Operations (Level 1) - This course is an entry level course on the set up and operations of a mobile crane. This course has classroom and hands-on exercises that cover basic crane knowledge, load charts, daily inspection, LMI set-up, outrigger and jib set-up for a variety of cranes.

Prerequisites for Level 1 – Member must have completed ITEC Level 1 Crane Operations course or be certified/licensed for hydraulic and/or lattice boom cranes. Certifications/licenses include NCCCO, OECP, Red Seal, Connecticut or New York State license.

MECHANICS TRAINING - TIER 4 DIESEL ENGINE AIR INDUCTION & EMISSIONS CONTROL

Mechanics Training - Tier 4 Diesel Engine Air Induction and Emissions Control

This course will give the student a strong foundation in Diesel engine air induction and emissions control. Upon completion, participants will be able to:

- Describe the functions, construction, types, styles, and applications of diesel engine intake systems and crankcase ventilation systems.
- Identify and describe the construction, types, styles, and application of turbochargers.
- Describe the functions, construction, and applications of diesel engine exhaust gas recirculation strategies.
- Explain the principles of operation of diesel exhaust emission aftertreatment systems and methods for performing inspection and diagnostic procedures.
- Identify and describe circuit monitoring strategies for out-of-range fault detection and identify and describe principles of fault detection and diagnosis.

The learning environment will be established in both the classroom and the service shop.

ENERGY CONSERVATION

Prerequisite: Students should have strong working knowledge of Electrical systems, HVAC systems and Building Automation systems.

Members of the International Union of Operating Engineers manage a large amount of the energy that is consumed in North America. Our involvement in this energy management endeavor is critical to its success. This course will explain the various aspects of energy management, metering, regulations, standards, energy auditing, and energy management solutions.

Please see course commercial: iuoentf.training/videos/energy-conservation.mp4

This is a lecture-based course:

Course Overview:

- Introduction to Energy Conservation
- The Energy Star Program and Energy Benchmarking

- The US Green Building Council and LEED
- Effective Energy Management
- Metering and Monitoring
- Energy Unit Conversions
- Energy Audits and Assessments
- Energy Conservation Opportunities
- Energy Bills
- Calculating Energy Savings
- Energy Cost Calculations Workshop
- The Building Envelope
- Boilers and Combustion Devices
- Steam and Condensate Systems
- HVAC Systems
- Electric Energy Management
- Lighting
- Building Automation Systems
- Waste Heat Recovery
- Lesson 19: Advanced Technologies
- Building Commissioning
- Project Management

ADVANCED CONTROLS & BUILDING AUTOMATION SYSTEMS

**ADVANCED CONTROLS &
BUILDING AUTOMATION SYSTEMS**

Prerequisite: Students should have taken Basic Controls and Building Automation Systems or have similar work experience

This advanced course has been developed for individuals who want to develop the understanding of how DDC controls and Building Automation Systems are installed, wired, operated, and programmed, also included is the insight of the various related software packages, that drive and manipulate these systems. We will discuss and demonstrate advanced control technologies dealing with the architecture of various manufactures of Building Automation Systems. We will demonstrate how they are installed, wired, and then programmed. Also, there will be main topic lectures on BAS Supervisory Controllers, Standalone controllers, and their communication protocols.
There will also be lectures on advanced control strategies and the understanding of building optimization for curtailing the use of energy.
After the completion of this course the participants will be able to:

- Describe the different types of control actions and when to use them
- Identify Building Automation System main components and where their used
- Define and select the proper Automation System for various locations
- Define the different types of Analog and Binary inputs and outputs
- Understand system wiring through various schematic diagrams of installed systems
- Wire Building Automation System main components
- Understand the various types of BAS communication protocols
- Program various type of industry controllers
- Comprehend the different types of operator interfaces and how they communicate
- Describe control strategies and how buildings are optimized for peak efficiency
- Define the different types of programming graphic methods

STATIONARY TRAINING CONFERENCE

Stationary Training Conference. This is for Local Union training staff and those invited by the local union to attend. Note, this is a 2 day event.

HIGH PRESSURE BOILER OPERATIONS

High Pressure Boilers course will help to assist in preparing the Stationary Engineer for the proper operation of High-Pressure boilers and will also help with preparing for the facility operating engineer licensing. This course provides a comprehensive overview of the safe and efficient operation of high-pressure steam boilers and related equipment. The latest combustion control technology, as well as EPA regulations and their implications, are covered in this course. The course is divided into sections to aid comprehension of key concepts:

- Steam Boilers
- Boiler Systems
- Steam Boiler Fittings
- Steam Systems
- Feedwater Systems
- Water Treatment
- Combustion Equipment
- Fuels and Combustion
- Combustion and Boiler Controls
- Draft Systems
- Instrumentation and Control Systems
- Steam Boiler Operation
- Licensing