Air Conditioning and Heat Pump Refrigeration Module

This four part seminar starts with the practical fundamentals and theory behind basic air conditioning and heat pump systems, and systematically moves through the process involved for Quality Installation (QI), Quality Maintenance (QM) and Quality Service (QS) of residential and light commercial air conditioning and heat pump systems as they apply to the California market (CAQI/CAQM/CAQS).

This seminar gives its participants the comprehensive skill sets required to properly install, commission, maintain, service, diagnose and verify that the air conditioning and heat pump systems they are working on are safe, reliable and operate at the highest capacity and energy efficiency possible.

Class 1 - Practical Fundamentals and Theory of the Refrigeration Circuit

Part 1 will review the basic physical properties of air conditioning, common definitions used in the trade, psychrometrics, the comfort index, indoor air quality, refrigerant properties and the practical fundamentals and theories used in all air conditioning and heat pump systems.

Class 2 - CAQI of Air Conditioning and Heat Pump Systems

Part 2 will cover the Quality Installation of air conditioning and heat pump systems as they apply to the California market (CAQI), including proper selection methodology, basic system components, system accessories, proper field installation techniques, basic zone systems, air filtration, humidification, and ventilation.

Class 3 - CAQM of Air Conditioning and Heat Pump Systems

Part 3 will focus on the Quality Maintenance of air conditioning and heat pump systems as they apply to the California market (CAQM) including proper system commissioning after installation and major component replacements, field instruments used for measuring refrigerant pressures and temperatures, condenser air temperatures, and conditioned temperatures, humidity, pressure, filtration, velocity and volume, proper field measuring techniques, system airflow adjustment and planned preventative maintenance.

Class 4 - CAQS of Air Conditioning and Heat Pump Systems

Part 4 is the application of all the information reviewed and learned in the previous classes to provide Quality Service of air conditioning and heat pump systems as they apply to the California market (CAQS) including proper service methodology, system diagnostic techniques, verification of system performance and professional repair vs. replacement recommendations.
Institute of Heating and Air Conditioning Industries, Inc. (IHACI)
2014 Training Class Outlines on California Quality Installation (CAQI), California Quality Maintenance (CAQM) and California Quality Service (CAQS)

**Air Distribution Module**

This four part seminar starts with the practical fundamentals and theory behind basic air distribution systems and systematically moves through the process involved for Quality Installation (QI), Quality Maintenance (QM) and Quality Service (QS) of residential and light commercial air distribution systems as they apply to the California market (CAQI/CAQM/CAQS).

This seminar gives its participants the comprehensive skill sets required to properly design, install, commission, maintain, service, diagnose and verify that the air distribution systems they are working on are safe, reliable and operate at the highest capacity and energy efficiency possible.

**Class 1 - Practical Fundamentals and Physical Properties of Air**
Part 1 will review the basic physical properties of air, common definitions used in the trade, psychrometrics, the comfort index, indoor air quality and the practical fundamentals and theories used in all air distribution systems.

**Class 2 - Practical Fundamentals and Theory of Proper Air Distribution Design**
Part 2 will cover the Quality Installation of air distribution systems as they apply to the California market (CAQI), including proper design methodology, basic system components, types of duct materials, fabrication tools, proper field installation techniques, basic zone systems, air filtration, humidification and ventilation.

**Class 3 - Fundamental Theory and Techniques of Air Side Design and Installation**
Part 3 will focus on the Quality Maintenance of air distribution systems as they apply to the California market (CAQM) including proper system commissioning after installation and major component replacements, field instruments used for measuring air temperature, humidity, pressure, filtration, and volume, proper field measuring techniques, system balancing and planned preventative maintenance.

**Class 4 - Advanced Theory and Techniques of Air Side Design and Installation**
Part 4 is the application of all the information reviewed and learned in the previous classes to provide Quality Service of air distribution systems as they apply to the California market (CAQS) including proper service methodology, system diagnostic techniques, verification of system performance, the whole house concept, interpreting reported customer problems, overall system analysis and professional repair vs. replacement recommendations.
Economizer Module

Although this four part seminar is an introduction to economizers, it includes a comprehensive overview of applied psychrometrics, fundamental theory, introduction and application of demand ventilation, codes, regulations, standards, utility rebates, financial benefits, basic economizer components, installation and PM requirements, different control strategies, commissioning, diagnostics, and concludes with an entire night of hands-on operation of different economizers the service technician will find in the field.

Class 1 - Economizers: Introduction/Fundamental Theory
Night 1: Starts with a fundamental overview of economizers, psychrometrics as they apply to client comfort and overall system efficiency, application to new and existing systems, current and upcoming 2014 codes, regulations, standards, financial benefits, existing and upcoming utility rebates, and concludes with an introduction of demand ventilation and its application to new and existing HVAC systems in the field.

Class 2 - Economizers: Intermediate: Components, Installation/Maintenance
Night 2: Is a detailed look into all the components, mechanics, assemblies, and operations the service technician will encounter in a typical economizer. It includes the installation and preventive maintenance details required by most units, and concludes with a brief overview of all the major control strategies used by the economizers found in the field today.

Class 3 - Economizers: Advanced: Set-up, Control Strategies and Commissioning
Night 3: Is a detailed and comprehensive discussion of all the major control strategies used by the economizers found in the field today, including the location and placement of all system controllers, temperature, enthalpy, and CO2 sensors, wiring, control reasons and methodologies, and concludes with actual setup and commissioning instructions.

Class 4 - Economizers: Practical-Hands on Experience
Night 4: Eight different, actual, full-size working economizers will be used to provide the seminar participants with a hands-on experience in the basic operation, setup, commissioning, preventative maintenance, diagnostics, refurbishment, and retro-commissioning of the economizers found in the field today.
Electrical Module

This four part seminar starts with the practical fundamentals and theory behind basic electricity, and systematically provides its participants with knowledge of electrical symbols, components, wiring diagrams, electronics and electrical systems. This seminar gives its participants the comprehensive skill sets required to properly install, commission, maintain, service, diagnose and verify that the electrical systems they are working on are safe, reliable and operate at the correct settings, for highest energy efficiency possible.

Class 1 - Practical Fundamentals and Theory of HVAC/R System Electrical:
Part 1 will review the basic fundamentals of electricity, electrical formulas, common definitions used in the trade, symbols, schematic diagrams and the practical fundamentals and theories used in all electrical systems.

Class 2 - Essential HVAC/R System Motor Theory for the Field Technician:
Part 2 will cover the interaction of electrical components in an electric system, introduction to schematic / component / and field wiring diagrams, power wiring and control wiring, thermostats, electronics, motors, proper field installation and electrical tools.

Class 3 - Different Electrical Components Found in the HVAC/R Industry:
Part 3 will focus on the operation of electrical systems as they apply to the California market (CAQM) including proper system maintenance after installation, component replacements and field instruments used for measuring voltage, amperage, resistance, capacitance and watts.

Class 4 - Electrical Schematics: A Roadmap to Diagnosing an HVAC/R System:
Part 4 is the application of all the information reviewed and learned in the previous classes to provide Quality Service of electrical systems as they apply to the California market (CAQS) including proper service methodology, system diagnostic techniques and verification of system performance.
Institute of Heating and Air Conditioning Industries, Inc. (IHACI)
2014 Training Class Outlines on California Quality Installation (CAQI), California Quality Maintenance (CAQM) and California Quality Service (CAQS)

Gas Heating Module

This two-part seminar starts with the practical fundamentals and theory behind basic gas heating systems and systematically moves through the process involved for Quality Installation (QI), Quality Maintenance (QM) and Quality Service (QS) of residential and light commercial gas heating systems as they apply to the California market (CAQI/CAQM/CAQS). Participants will receive the comprehensive skill sets required to properly install, commission, maintain, service, diagnose and verify that the gas heating systems they are working on are safe, reliable and operate at the highest capacity and energy efficiency possible.

Class 1 - Practical Fundamentals and Theory of Gas Heating
Part 1 will review the basic physical properties of gas heating, common definitions used in the trade, psychrometrics, the comfort index, indoor air quality, fuel gas properties and the practical fundamentals and theories used in all gas heating systems.

Class 2 - California Quality Installation, Maintenance, and Service of Gas Heating Systems
Part 2 will cover the Quality Installation, Quality Maintenance, and Quality Service of gas heating systems as they apply to the California market (CAQI, CAQM, and CAQS), including proper selection methodology, proper system commissioning, major component replacements, field instruments used for measuring gas fuel temperatures, pressures, and flow, planned preventative maintenance, system diagnostic techniques, and verifying the heating system is operating at the highest capacity and energy efficiency possible.
System Diagnostics Module

This four part seminar starts with the fundamentals and theory behind the residential and light commercial diagnostic process and covers all aspects of the HVAC system including the mechanical, electrical, refrigeration, air distribution, gas, venting, condensate, indoor air quality and whole house concept sections. This seminar will equip its participates with the broad skill sets required to properly obtain, record, evaluate, analyze, identify and eliminate all operating problems reported and revealed thru the diagnostic process and concludes by verifying that the HVAC systems they are working on are safe, reliable and operate at the highest capacity and energy efficiency possible.

Class 1 - Practical Fundamentals, Theory, Methodology and Mindset of True System Diagnostics:
Part 1 will review the basic definition, description, methodology, outline, and theory behind the system diagnostic process. Operating aspects of Quality Design (QD), Quality Installation (QI), Quality Maintenance (QM), Quality Service (QS), and ultimately Quality Performance (QP) as they apply to the California market (CAQD/CAQI/CAQM/CAQS/CAQP) and the diagnostic process will be covered as well.

Class 2 - Essential Field Techniques Required to Investigate the HVA/R System:
Part 2 begins with the client’s reported symptom(s) or concern(s), covers the diagnostic tools and instruments used to obtain measurements of the system, and provides the proper field techniques required to investigate the system by observing, obtaining, and recording all relevant information and data concerning the system.

Class 3 - Evaluating, Analyzing, and Ultimately Identify the Root Cause(s) of the HVAC/R System:
Part 3 will focus on the information provided by the client, and the observations and data obtained by the field technician to evaluate, analyze, and ultimately identify the root cause(s) of the reported symptom(s).

Class 4 - Accurate Elimination and Verification of the Root Cause(s) of the HVAC/R System:
Part 4 starts with exploring possible alternatives to simply replacing the non-functioning or defective component, examines the repair vs. replacement question, covers reporting the diagnoses to the client, the client’s decision making process, outlines the proper corrective action to eliminate the symptom(s) or problem(s) and concludes by the field technician verifying that not only is the system working, but is working safely, reliably and operating at the highest capacity and energy efficiency possible.
System Performance Module

This four-part seminar starts with the fundamentals and theory behind residential and light commercial HVAC system performance with an overview of Quality Design (QD), Quality Installation (QI), Quality Maintenance (QM) and Quality Service (QS) as applied to the California market. CAQD/CAQI/CAQM/CAQS introduces and details the “whole house” concept, outlines the instruments and field techniques required to measure HVAC system performance, and problem solves any issues discovered. Participants will receive the comprehensive skill sets required to understand and evaluate the whole HVAC system and provide the client with an HVAC system that will be safe, reliable and operate at the highest capacity and energy efficiency possible.

Class 1 - Thermodynamics: Heat in Motion
Part 1 will introduce and detail the “whole house” concept as it applies to our field, and will identify and explain the most common building envelope and weather issues, including investigating the building envelope, evaluating and analyzing the observations and data collected, and concludes by discussing possible solutions and various responsibilities of envelope discovered problems.

Class 2 - HVAC: A Sub-system of the Building
Part 2 will introduce the concept and ramifications of the HVAC system being a sub-system in the building envelope and provides the participates the skill sets required in identifying the direct and indirect problems that will affect system performance and concludes by the HVAC contractor reporting and providing the client the information resources needed to verify and/or restore peak capacity and energy efficiency to their HVAC systems.

Class 3 - Heating System: Comfort with Energy Efficiency
Part 3 will introduce the basic theory behind client comfort while operating the heating and humidification systems at peak capacity and performance. This class will explain the skill sets required in using the proper instruments and field techniques to measure total heating system capacity, energy consumption, and then introduce the methods and formulas required to calculate the overall heating system performance. Proper heating system Quality Installation, Maintenance, and Service as applied in the California market (CAQI/CAQM/CAQS) will be explored on all levels.

Class 4 - Cooling System: Comfort with Energy Efficiency
Part 4 will introduce the basic theory behind client comfort while operating the cooling and de-humidification systems at peak capacity and performance. This class will explain the skill sets required in using the proper instruments and field techniques to measure both sensible and latent cooling system capacity, energy consumption, and then introduce the methods and formulas required to calculate the total (enthalpy) cooling system performance. Proper cooling system Quality Installation, Maintenance, and Service as applied in the California market (CAQI/CAQM/CAQS) will be explored on all levels.
CA 2013 Title-24 Module

The 2013 Title-24 codes and standards are set to take effect on January 1, 2014. Are you ready?

This two-part seminar is a comprehensive look at California Title 24 Energy Standards and Regulations regarding HVAC installations, change-outs, alterations, and repairs. This seminar includes discussion designed to clarify 2013 Title 24 HVAC Standards and Regulations questions the contractor, HVAC designer, installer, or homeowner may have relating to the installation and repair of the HVAC system.

Night 1: Participants will learn the practices and procedures required for H.E.R.S. verification, contractor registration, and electronic H.E.R.S. registration including introduction of the California Green Building Standards Code which have been “adopted and mandated” by many cities and municipalities throughout California. Clarification of the new 2013 Title 24 codes and standards which are set to take effect on January 1, 2014 will be discussed, and a question and answer session will follow.

Night 2: Begins with a hands-on, live instrument calibration section, with easy in-shop methods of ensuring your measuring devices are in sync with your H.E.R.S Rater. Topics include the H.E.R.S. forms and process involved with H.E.R.S. registration, refrigerant charge measurement parameters, identifying superheat and subcooling targets, and other various measures taken during the H.E.R.S. inspection. There will also be a discussion on the importance of delivered BTU’s to the conditioned space.
Join the growing number of professionals who demonstrate proficiency in the HVAC/R industry by becoming certified by NATE (North American Technician Excellence). NATE is a nationally recognized certification program for heating, ventilation, air-conditioning and refrigeration technicians, and it is the only test supported by the entire industry. More customers are placing a high priority on locating a certified expert and NATE certification help HVAC professionals keep a competitive edge.

This series of seminars are specifically designed to help experienced HVAC professionals prepare for successfully completing the NATE Certification Exam. For the convenience of working professionals, these classes are held on weekday evenings and will be followed by an opportunity to complete the NATE Exam on a Saturday. There will be a fee for the NATE exam; however there is no charge for the preparation series.

This important training opportunity is offered as part of IHACI’s commitment to provide exceptional service. Attending the entire eight-part series is strongly suggested.

**Core 1 (General Skills) and Core 2 (Electrical Skills)**

NATE Core Modules 1-2: This two night course is both an introduction to the heating, ventilating and air conditioning industry and a review of the personal and business skills needed to succeed in this industry. The introduction covers HVAC terminology, proper use of tools, mechanical principles, and electricity and wiring diagrams. The review includes communication skills, mathematics, science, working skills, HVAC careers and safety.

**Gas Heating:**
**Part 1 (Introduction) and Part 2 (Installation & Service)**

NATE Modules 3 and 4: Part 1 will focus on gas heaters used in furnaces and package units. In addition to reviewing the basics of gas heat, discussion will include gas heat equipment and components.

Part 2 will delve further into gas heat by covering equipment installation and service procedures.

**Air Conditioners & Heat Pumps:**
**Part 1 (Introduction) and Part 2 (Installation & Service)**

NATE Modules 5 and 6: Part 1 will review the mechanical refrigeration cycle and provide an introduction to air conditioners and their components. Also discussed will be reverse-cycle heat pumps and their similarities and differences with standard air conditioners.

Part 2 will focus on air conditioner and heat pump equipment installation and service procedures.

**Air Distribution:**
**Part 1 (Introduction) and Part 2 (Installation & Service)**

NATE Modules 7 and 8: Part 1 will review the basic physical properties of air and provide an introduction to modern air distribution systems.

Part 2 will focus on designing an actual HVAC air distribution system and will review field diagnostic techniques that can be used to solve air distribution problems.