



## National Environmental Balancing Bureau

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### NEBB E-Learning Courses

*If you're a NEBB certification Candidate looking to enhance your knowledge as part of your self-study process, **OR** if you are a NEBB Certified Professional or Certified Technician who needs continuing education, **OR** if you are an employer looking for an efficient way to train new employees in specific areas, NEBB has a cadre of affordable online courses to choose from!*

#### Details:

1. Individuals can select the online course(s) of their choice from the ala carte online course menu below.
2. Online courses range from 1.5 to 7 professional development hours.
3. Online courses are available in Imperial Standard (I-P); some are available in Metric (SI).
4. Individuals have a 12-month access to the online courses once they register.
5. Each online course has a test at the end of the instruction.
6. Individuals must achieve 80% or higher to pass and receive the Certificate of Online Course Completion
  - a. The final test has unlimited attempts.
  - b. If the user fails the test, they can retake as many times as they want until they pass the course.
  - c. There is no charge for retaking the test.
7. At completion of each online course, NEBB Individuals will receive a Certificate of Completion available electronically through the ASHRAE portal.
8. Interested individuals should complete the order form at the end of this document to enroll for the course (s) of their choice.
  - a. **Questions? Call NEBB at 301-977-3698!**

*This online eLearning program has been made available through a cooperative venture between ASHRAE and NEBB.*

### NEBB's Ala Carte On-line Course Menu

#### **Airflow, Equipment Placement and Heat Release** *(Advanced Level: CPT) Imperial*

This course provides airflow guidelines for the placement of data processing and communication equipment. **Cost: \$58.00**

This module is approved by NEBB for **1.0 professional development hours**

#### **Air and Water Systems** *(Essentials Level I: TAB) Imperial*

This course covers the applications, advantages, and disadvantages of air-and-water systems, as well as main component arrangement for maximum efficiency.

**Cost: \$58.00**

This module is approved by NEBB for **2.0 professional development hours**

### **Basics of Electricity** *(Essentials Level 1: TAB, BSC, FHT, RCx) Imperial*

This module provides the electrical knowledge needed to understand controls and the use of electrical circuit drawings.

After completing this module, you will be able to:

- Apply basic electricity concepts to simple electrical circuits
- Calculate volts, watts, and amps using Ohm's law and the Power law
- Calculate voltage for resistances in series
- Calculate combined resistance for resistances in parallel
- Recognize the effect of capacitors and inductors on current and on voltage
- Recognize the configuration of 3-phase, 4-wire service
- Comprehend the use and function of relays
- Apply basic electricity concepts to simple electrical circuits.
- Recognize how motor starters function
- Identify the advantages for variable speed drives for fans
- Identify relay logic using electrical circuit drawing

**Cost: \$58.00**

This module is approved by NEBB for **4.5 professional development hours**

### **Control Diagrams and Sequences** *(Essentials Level II: TAB, BSC, FHT, RCx) Metric*

This module explains the use of written specifications, schedules, and drawings to clearly identify what is to be installed, how it is to be installed, and how it is expected to operate.

After completing this module, you will be able to:

- Apply design concepts that will result in a workable and flexible control systems
- Recognize the responsibilities of the various designers and contractors in the typical control system design and construction process.
- Interpret a control diagram using standard symbols.
- Interpret guidelines for writing a control sequence.

**Cost: \$58.00**

This module is approved by NEBB for **3.5 professional development hours**

### **Control Valves and Dampers** *(Essentials Level 1: TAB, BSC, FHT, RCx) Metric*

This module teaches the various types of valves and dampers, and their selection, installation and operation.

After completing this module, you will be able to:

- Identify valve parts and valve types
- Select valves based on their characteristics for various applications
- Discriminate between 2-way and 3-way valve characteristics and performance
- Calculate pressure drop and the valve flow coefficient.
- Recognize the types and appropriate uses of dampers for air flow control in various applications
- Understand damper leakage ratings and how they are used
- Determine damper pressure drops
- Determine damper size

**Cost: \$58.00**

This module is approved by NEBB for **6.5 professional development hours**

### **DDC Introduction to Hardware and Software** *(Essentials Level 1: BSC, RCx) Metric*

This module introduces control theory and explains how evaluate, select, position and sequence the appropriate type of control.

After completing this module, you will be able to:

- Define the components of the control loop
- Identify open loop and closed loop controls
- Recognize the relationship between gain and throttling range.
- Recognize how two-position, floating, and modulating control loops function
- Determine the appropriate type of control mode for select situations
- Understand the mechanism of action for floating control loops
- Know the definitions for terms related to proportional plus integral plus derivative (PID) control logic
- Identify the concept of fuzzy logic
- Recognize the difference between direct acting and reverse acting controls
- Identify fundamentals of control position and sequencing

**Cost: \$63.00**

This module is approved by NEBB for **2.0 professional development hours**

### **DDC Networks and Protocols** *(Essentials Level 1: BSC, RCx) Imperial*

With this module, you will understand the interoperability of controllers, network and data protocols. It also introduces BACnet and LonWorks.

After completing this module, you will be able to:

- Comprehend network components, how they influence information flow, and how they relate to each other within a system
- Recognize the interoperability issues within systems and between their components
- Identify the common network standards used in HVAC and their limitations.
- Recognize the significance of information protocols
- Identify the components of BACnet and LonWorks
- Identify the difference between BACnet and LonWorks
- Identify how BACnet and LonWorks can work on the same network.

**Cost: \$63.00**

This module is approved by NEBB for **1.5 professional development hours**

### **DDC Specification, Installation and Commissioning** *(Essentials Level 1: BSC, RCx) Imperial & Metric*

Understanding interoperability of controllers, network and data protocols with an introduction to BACnet and LonWorks

After completing this module, you will be able to:

- Recognize advantages and challenges of DDC systems
- Comprehend the DDC design process
- Be aware of several interoperability and bidding issues

**Cost: \$63.00 (Imperial)**

This module is approved by NEBB for **2.0 professional development hours**

**Cost: \$58.00 (Metric)**

This module is approved by NEBB for **4.5 professional development hours**

### **Electric Controls** *(Essentials Level II: TAB, BSC, FHT, RCx) Imperial*

This module provides instruction on introduction to electric controls, control diagrams and control logic.

After completing this module, you will be able to:

- Recognize how bridge circuits are used to provide modulating electric controls
- Understand the range of actuators and their auxiliary devices available to drive valves and dampers
- Comprehend how one can trace around a simple control drawing

**Cost: \$58.00**

This module is approved by NEBB for **2.0 professional development hours**

### **Energy Conservation and Efficiency in Building** *(Essentials Level: I) Imperial*

This module gives an overview of energy conservation and energy efficiency, and differentiates the different ways that energy conservation and efficiency can be applied to both new and renovated buildings:

- State the difference between energy conservation and energy efficiency
- Identify methods of energy conservation
- Outline the range of a building's energy efficiency requirements of ANSI/ASHRAE/IES Standard 90.1
- List benefits of energy efficiency for new buildings

**Cost: \$63.00**

This module is approved by NEBB for **1.5 professional development hours**

### **Hydronic Systems** *(Essentials Level II: TAB, BSC, RCx) Imperial*

This module shows the components, strengths and weaknesses of hydronic systems, the effects of varying water flow, and considerations for effective ventilation.

Upon completion of this module you will be able to:

- Describe natural convection and low temperature radiation heating systems
- Identify the benefits and
- Weaknesses of natural convection and low temperature radiation heating systems
- Recognize the effects of varying water flow and temperature in controlling water heaters
- Comprehend the ventilation options for hydronic heating systems

**Cost: \$58.00**

This module is approved by NEBB for **2.5 professional development hours**

### **Essentials of Controls** *(Essential Level I) Imperial*

This course introduces controls and their basic types. It explains why they can be complex, but why they are essential to most HVACR systems. It lays the groundwork for more advanced specification, implementation and troubleshooting skills.

By the end of this course, you will be able to:

- Explain what controls are and what they can do
- Differentiate between open and closed loops
- Define specific terminology used with controls
- Identify basic types of controls
- State basic mathematical terms associated with control functions

**Cost: \$63.00**

This course has been awarded **1.5 professional development hours**

**Introduction to HVAC Systems** (*Essentials Level 1: TAB, BSC, FHT, RCx*) *Imperial*

This module will provide you with an understanding of simple psychrometric charts and how to use them. It also provides a description of basic system components and operation of the economizer cycle. Upon completion of this module, you will be able to:

- Identify terms used in the psychrometric charts
- Identify important components of the psychrometric charts
- Plot conditions on the psychrometric charts
- Use the psychrometric charts to interpret data

**Cost: \$63.00**

This module is approved by NEBB for **3.5 professional development hours**

**Load Calculations** (*Essentials Level II: TAB, BSC, CPT, RCx*) *Imperial*

This course explains the process of calculating heating and cooling loads.

**Cost: \$63.00**

This module is approved by NEBB for **2.0 professional development hours**

**Pneumatic Controls** (*Essentials Level II: TAB*) *Imperial*

This module provides instruction on the components of pneumatic systems and control applications diagrams. After completing this module, you will be able to:

- Recognize terms related to pressure and its measurement
- Recognize how bleed and non-bleed thermostats and controllers operate
- Comprehend the range of components available in pneumatic controls
- Be familiar with common HVAC pneumatic control applications diagrams

**Cost: \$58.00**

This module is approved by NEBB for **3.0 professional development hours**

**Psychrometrics** (*Essentials Level II: TAB, BSC, CPT, RCx*) *Imperial*

This course covers psychrometrics and explains the physical and thermodynamic properties of gas-vapor mixtures.

**Cost: \$63.00**

This module is approved by NEBB for **1.5 professional development hours**

**School of Hard Knocks: Controlling Moisture & Humidity in Buildings** (*Intermediate: TAB, BSC, BET, RCx*) *Imperial*

This course shows how dry buildings are healthier and more resilient, comfortable, and energy-efficient than damp or moldy buildings. Dry buildings have better indoor air quality, and cost less to operate, last longer, and hold less financial and professional risk for their designers and builders, given that moisture problems are the leading cause of claims against errors and omissions insurance of architects, engineers and contractors. **Cost:**

**\$58.00**

This module is approved by NEBB for **3.0 professional development hours**

**Sensors and Auxiliary Devices** (*Essentials Level I: BSC, RCx*) *Imperial*

This module teaches the terminology and attributes of sensors, the selection of moisture sensors, pressure, flow, and auxiliary devices. After completing this module, you will be able to:

- Recognize:
  - The various types of temperature sensors

- The various types of moisture sensors
- How differential pressure is sensed
- The use of auxiliary devices common to control systems
- Select:
  - Temperature sensors based on their features and parameters
  - Air and water flow sensors for the HVAC applications for which they are best suited
  - Moisture sensors based on their features and parameters
- Use the psychrometric chart to assess moisture and energy load
- Understand the process of interpreting data to determine if a sensor is working properly
- Identify terms related to pressure and its measurement

**Cost: \$58.00**

This module is approved by NEBB for **7.5 professional development hours**

### **Special Applications** (*Essentials Level I: TAB, BSC, RCx*) *Imperial*

In this module, you will learn about radiant heating and cooling, thermal storage, room air distribution and humidity control

- Upon completion of this module you will be able to:
- Identify applications for radiant heating and cooling.
- Recognize the advantages of radiant heating and cooling.
- Recognize the issues related to ceiling radiant cooling.

**Cost: \$58.00**

This module is approved by NEBB for **4.0 professional development hours**

### **Indoor Environmental Conditions for Human Comfort** (*Essentials Level II*) *Imperial*

This module will provide you with an understanding of the factors determining thermal comfort. It also covers the comfort envelope, necessary for designing systems that operate within acceptable ranges.

Upon completion of this module you will be able to:

- Identify the seven factors that influence thermal comfort
- Explain how thermal conditions and the individual influence thermal comfort
- Choose acceptable thermal design conditions

**Cost: \$63.00**

This course has been awarded **1.5 professional development hours**

### **Ventilation and IAQ** (*Essentials Level II: CPT*) *Imperial*

This module will provide you with an understanding of the types, sources, and effects of air contaminants and how to control them, as well as the basic concepts of ASHRAE Standard 62.1

Upon completion of this module you will be able to:

- Identify types and sources of indoor air contaminants and pollutants
- Comprehend the effects of pollutants and contaminants on health
- Comprehend the basic concepts of the ASHRAE Ventilation Standard 62.1-2004

**Cost: \$63.00**

This course has been awarded **2.0 professional development hours**



# ASHRAE / NEBB Online Course Order Form

Name \_\_\_\_\_ Date \_\_\_\_\_

Company \_\_\_\_\_

Address/City/State/Zip \_\_\_\_\_

Email \_\_\_\_\_ Phone \_\_\_\_\_

Payment:  MC  VISA  AmEx Amount \_\_\_\_\_

Credit Card # \_\_\_\_\_ Exp. Date \_\_\_\_\_ SC \_\_\_\_\_

	PDHs	Description	Unit Price	Course Code	Line total
1	1.0	Airflow, Equipment Placement & Heat Release	\$58.00	168597(IP)	
2	2.0	Air & Water Systems	\$58.00	168179 (IP)	
3	4.5	Basics of Electricity	\$58.00	168508 (IP)	
4	3.5	Control Diagrams & Sequences	\$58.00	168557 (SI)	
5	6.5	Control Valves & Dampers	\$58.00	168510 (SI)	
6	2.0	DDC Intro to Hardware & Software	\$63.00	168513 (SI)	
7	1.5	DDC Networks & Protocols	\$63.00	242238 (IP)	
8	2.0	DDC Specs, Installation & Commissioning (New!)	\$63.00	168515 (IP)	
9	4.5	DDC Specs, Installation & Commissioning (New!)	\$58.00	168560 (SI)	
10	2.0	Electric Controls	\$58.00	168287 (IP)	
11	1.5	Energy Conservation and Efficiency in Buildings (New!)	\$63.00	242283 (IP)	
12	2.5	Hydronic Systems	\$58.00	242279 (IP)	
13	1.5	Essentials of Controls (New!)	\$63.00	168187(IP)	
14	3.5	Intro HVAC Systems (New!)	\$63.00	242652 (IP)	
15	2.0	Load Calculations (New!)	\$63.00	168168 (IP)	

16	3.0	Pneumatic Controls	\$58.00	168289 (IP)	
17	1.5	Psychrometrics	\$63.00	168297 (IP)	
18	3.0	School of Hard Knocks: Controlling Moisture & Humidity in Buildings	\$58.00	30014 (IP)	
19	7.5	Sensors & Auxiliary Devices	\$58.00	168511 (IP)	
20	4.0	Special Applications	\$58.00	242285 (IP)	
21	1.5	Indoor Environmental Conditions for Human Comfort (New!)	\$63.00	242236 (IP)	
22	2.0	Ventilation & IAQ	\$63.00	255166 (IP)	
				<b>Subtotal</b>	
				<b>Total</b>	

### NEBB Ala Carte Online Course Registration Process

Below are the steps to enroll/register in the eLearning courses:

- 1) Interested individuals should complete the order form included with this document and email to [certification@nebb.org](mailto:certification@nebb.org).
  - a. *Questions? Call NEBB at 301.977.3689*
- 2) NEBB will charge and collect the agreed upon fees from the individual for the respective Ala Carte online course.
- 3) NEBB sends ASHRAE a list of individuals (s) who have paid for the course (s) within 24 hours of payment.
  - a. The list includes individual's first name, last name, email address, and course (s) paid for.
- 4) ASHRAE creates accounts for each individual.
- 5) ASHRAE enrolls each respective individual into the course.
- 6) ASHRAE will send an email to each respective individual with eLearning portal access credentials and the url to access the course.
- 7) Individual logs in to complete the online course.
- 8) If individual has any difficulties with login or course access, they should contact [elarning@ashrae.org](mailto:elarning@ashrae.org).
  - a. This support email address can also be found in the eLearning portal.
- 9) Once the respective individual completes reviewing the course materials and final exam, a certificate of completion will become available for them to print for their records.
- 10) Payment of the fee for each course guarantees an enrollee 12 months access to the respective course.