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System

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**DAIKIN**

## HVAC SYSTEMS PROGRAM: SEMESTER B

### HVAC SYSTEMS PROGRAM OVERVIEW

The Daikin HVAC Systems Program combines the knowledge and experience of Daikin's Principles of HVAC, Principles of Air Systems Design, Principles of Refrigeration, Principles of Chiller Plant Design, and Building Systems classes into one comprehensive program that uses a blended learning approach.

This program utilizes both **VIRTUAL INSTRUCTOR LEAD (VILT)** and **SELF-DIRECTED** learning methods.

#### Target audience:

- Engineers
- Building Operators
- Contractors

#### This higher education level course includes:

- Five (5) month live instructor access

HVAC Systems Program	Estimated Hours to Complete	CEU Credit Eligibility
	49	4.9

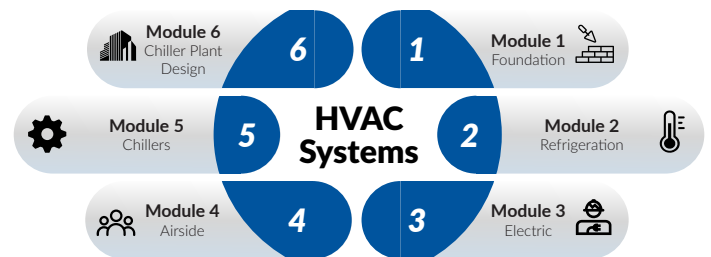
#### Full Program Cost

Per Person: **\$1000**

#### Per Module Cost

Individual Module Per Person **\$200**

**Best Value!**



### MODULES OFFERED

#### 6 MODULE PROGRAM or "A LA CARTE"

Choose to complete the entire 6 module program or register for the individual modules that most interest YOU!

**6 Module Program** Aug 18th - Dec 12th

**1. Foundations** Aug 18th - Aug 29th

**2. Refrigeration** Sept 8th - Sept 19th

**3. Electric** Sept 29th - Oct 10th

**4. Airside** Oct 20th - Oct 31st

**5. Chillers** Nov 10th - Nov 21st

**6. Chiller Plant Design** Dec 1st - Dec 12th

Scan or click for more info:



## SEMESTER B SCHEDULE AUGUST – DECEMBER 2025

### Completion Requirements:

- A certificate of completion for the modules will only be provided if the participant completes ALL of the tests for that module.
- There is an opportunity for attendees to earn CEU credits. This designation must be known prior to the start of each module. See last page for CEU eligibility.
- If you are earning CEU credits, attending ONE VILT SESSION per module is required; each VILT session is 90 minutes and are stated in EST
- Two weeks prior to each module's start date, an e-mail will be sent to choose a VILT session on a first come, first served basis.

MODULE	PATHWAY	Est. Hrs	CEU Credits	DATES
<b>AUGUST</b>	<b>Intro to HVAC (VILT)</b>			
Module 01 Foundations	Intro to Plans	7.75	0.8	Self-directed content to do online between AUGUST 18TH to AUGUST 29TH
	Thermodynamics			
	Psychrometrics			
	Hydronics and Pumps			
<b>SEPTEMBER</b>	<b>Refrigeration Components (VILT)</b>			
Module 02 Refrigeration	Refrigeration Cycle	5.5	0.6	Self-directed content to do online between SEPTEMBER 8TH to SEPTEMBER 19TH
	Energy Recovery for Refrigeration			
<b>SEPT - OCT</b>	<b>Motors and VFDs (VILT)</b>			
Module 03 Electric	Electrical Basics	10	1	Self-directed content to do online between SEPT 29TH to OCT 10TH
	Electrical Schematics			
	Controls Concepts for HVAC			
	Controls Components			
<b>OCTOBER</b>	<b>Air Distribution (VILT)</b>			
Module 04 Airside	Coils	7.41	0.7	Self-directed content to do online between OCTOBER 20TH to OCTOBER 31ST
	Fans			
	Air Handler Units			
	Rooftop Units			
	Controls for Air Handler Units			
<b>NOVEMBER</b>	<b>Chiller Types (VILT)</b>			
Module 05 Chillers	Chiller Basics	9.5	1	Self-directed content to do online between NOVEMBER 10TH to NOVEMBER 21ST
	Constant Flow Systems			
	Variable Flow Systems			
	Low Delta T			
	Condenser Water Systems & Cooling Towers			
	Controls			
<b>DECEMBER</b>	<b>Chiller Plant Variations (VILT)</b>			
Module 06 Chiller Plant Design	Chiller Plan Optimization	8.25	0.8	Self-directed content to do online between DECEMBER 1ST to DECEMBER 12TH
	Energy Recovery for Refrigeration			
	Water-Side-Free-Cooling			
	Thermal Storage in CHW Systems			
	Process Cooling			
	District Cooling			

## MODULE 1: FOUNDATIONS

Total CEU Credit Hours for Module

Est. Hrs. to Complete: 7.75

CEU Credits Eligibility: 0.8

### INTRO TO HVAC VILT

- Identify each type of HVAC equipment (water-cooled chiller, air-cooled chiller, water-source heatpump, rooftop unit, air handler unit, air terminal system, and variable refrigerant volume)
- Explain how each type of equipment works in a system

### INTRO TO PLANS SELF-DIRECTED ONLINE CONTENT

- Read the sequence order of a plan to use in the field
- Identify the most common HVAC-associated symbols on a plan
- Identify the scale of a given plan
- Use the support column grid to successfully navigate a plan
- Identify the correct sequence of key components
- Explain how the key components fit into piping, duct work, and plumbing

### THERMODYNAMICS SELF-DIRECTED ONLINE CONTENT

- Describe the differences between latent and sensible heat
- Describe each type of heat transfer (radiation, conduction, and convection)
- Provide examples of each type of heat transfer
- Calculate heat transfer to size a coil (sales) or to check coil efficiency (service)
- Explain the relationship between pressure and temperature

### PSYCHROMETRICS SELF-DIRECTED ONLINE CONTENT

- Read a psychrometric chart and locate a state point on the chart
- Use a psychrometric chart to calculate the state point between outside air and return air in order to determine the correct damper positioning
- Explain the relationship between air flow and humidity, and the impact equipment could have on each
- Plot key types of HVAC equipment on a psychrometric chart
- Explain how to remove latent or sensible energy by confirming or sizing a refrigerant coil

### HYDRONICS AND PUMPS SELF-DIRECTED ONLINE CONTENT

- Identify key components of a hydronic system
- Accurately read a pump curve
- Identify causes for cavitation in a pump
- Convert measurements from Pounds per Square Inch Gauge (PSIG) to Foot of Head (FtHd)
- Calculate an equivalent piping length

## MODULE 2: REFRIGERATION

Total CEU Credit Hours for Module

Est. Hrs. to Complete: 5.5

CEU Credits Eligibility: 0.6

### REFRIGERATION CYCLE COMPONENTS VILT

- Identify the primary components of the refrigeration cycle
- Explain the purpose of each primary component of the refrigeration cycle
- Identify the secondary components of the refrigeration cycle
- Explain the correct sequence of the refrigeration cycle components
- Explain the refrigerant state in each stage of the refrigeration cycle

### REFRIGERATION CYCLE SELF-DIRECTED ONLINE CONTENT

- Explain the purpose of the refrigeration cycle within HVAC system
- Explain latent, sensible, and specific heat within the refrigeration cycle
- Identify the areas of the refrigeration cycle where specific types of heat are transferred
- Identify different applications where the refrigeration cycle is used

### ENERGY RECOVERY FOR REFRIGERATION SELF-DIRECTED ONLINE CONTENT

- Explain energy recovery applications that affect refrigeration
- Explain environmental conditions where energy recovery is the best application
- Identify energy recovery applications by their piping layout

## MODULE 3: ELECTRIC

Total CEU Credit Hours for Module

Est. Hrs. to Complete: 10

CEU Credits Eligibility: 1

### MOTORS AND VFDS VILT

- Explain how a motor operates
- Identify the HVAC types of motor designs and configurations
- Explain how the types of motor starters function
- Explain power factor as it applies to motors

### ELECTRICAL BASICS SELF-DIRECTED ONLINE CONTENT

- Explain how power distribution works
- Explain how electricity flows
- Use Ohm's Law to calculate current, voltage, and resistance
- Explain the relationship between electricity and magnetism
- Explain how the basic components in electrical equipment work (switches, fuses, contactors, relays, capacitors, resistors/resistance/electrical loads, diodes, transformers, and thermostats)

### ELECTRICAL SCHEMATICS SELF-DIRECTED ONLINE CONTENT

- Identify electrical terms, acronyms, and symbols
- Explain how to read an electrical schematic
- Identify practical approaches to problem solving when working with an electrical system

### CONTROLS CONCEPTS FOR HVAC SELF-DIRECTED ONLINE CONTENT

- Describe the three levels of controls for HVAC (unit, system, BMS/BAS)
- Explain how key terminology is used in the control process
- Explain the basic control strategies
- Explain the four different types of control point
- Describe the four types of modulating controls

### CONTROLS COMPONENTS SELF-DIRECTED ONLINE CONTENT

- Describe the types of control sensors
- Describe the types of control dampers
- Describe the types of valves

## MODULE 4: AIRSIDE

Total CEU Credit Hours for Module

Est. Hrs. to Complete: 7.41

CEU Credits Eligibility: 0.7

### AIR DISTRIBUTION VILT

- Identify different methods of air distribution
- Explain how each method of air distribution works

### COILS SELF-DIRECTED ONLINE CONTENT

- Describe different coil types
- Explain the different uses and benefits of each coil type

### FANS SELF-DIRECTED ONLINE CONTENT

- Use fan curves and fan laws to determine the most useful fan type for a specific application
- Identify fan type by blade configuration
- Determine the safe operation range of a fan type
- Explain fan laws and why they are used

### AIR HANDLER UNITS SELF-DIRECTED ONLINE CONTENT

- Identify the major components in an air handler unit
- Explain the function of the major components in an air handler unit under varying conditions
- Explain the importance of casing design in air handler unit performance

### ROOFTOP UNITS SELF-DIRECTED ONLINE CONTENT

- Identify the major components in a rooftop unit
- Explain the function of the major components in a rooftop unit
- Describe the differences between a DOAS and a standard rooftop unit

### CONTROLS FOR AIR HANDLER UNITS SELF-DIRECTED ONLINE CONTENT

- Describe control strategies for air handler units
- Explain the interaction of AHU and RTU controls to include air flow, enthalpy, temperature, and pressure

## MODULE 5: CHILLERS

Total CEU Credit Hours for Module

Est. Hrs. to Complete: 9.5

CEU Credits Eligibility: 1

### CHILLER TYPES VILT

- Demonstrate the ability to knowledgeably discuss chiller basics
- Explain how an air-cooled chiller works
- Explain how a water-cooled chiller works
- Explain the basics of an absorption chiller
- Knowledgeably discuss relevant AHRI standards

### CHILLER BASICS SELF-DIRECTED ONLINE CONTENT

- Explain lift, or pressure ratio
- Explain the Carnot Cycle and Coefficient of Performance (COP)
- Describe condenser water relief using AHRI standards

### CONSTANT FLOW SYSTEMS SELF-DIRECTED ONLINE CONTENT

- Explain how constant flow systems function in single chiller plants, parallel chiller plants, and series chillers
- Explain series counter flow

### VARIABLE FLOW SYSTEMS SELF-DIRECTED ONLINE CONTENT

- Describe how a primary-secondary water system works
- Explain a variable primary flow system
- Explain pump control related to variable flow systems
- Explain chiller staging

### LOW DELTA T SELF-DIRECTED ONLINE CONTENT

- Explain Low Delta T and Low Delta T Syndrome
- Determine possible causes of Low Delta T

### CONDENSER WATER SYSTEMS AND COOLING TOWERS SELF-DIRECTED ONLINE CONTENT

- Demonstrate an understanding of Cooling Technology Institute (CTI) standards for cooling towers
- Describe approach and range of a cooling tower
- Explain Total Dissolved Solids (TDS) and the importance of make-up water
- Distinguish different configurations of cooling towers

### CONTROLS SELF-DIRECTED ONLINE CONTENT

- Describe the general control sequence of operation for a chiller
- Explain how leaving chilled water reset works
- Identify external equipment that can be controlled with Daikin chillers
- Explain how system design and control sequence can help with Low Delta T Syndrome and compressor short cycling
- Describe the basic sequence of operation for primary-secondary flow and variable primary flow

## MODULE 6: CHILLER PLANT DESIGN

Total CEU Credit Hours for Module

Est. Hrs. to Complete: 8.25

CEU Credits Eligibility: 0.8

### CHILLER PLANT VARIATIONS VILT

- Discuss key considerations for alternative fuels in chiller plant design
- Explain the requirements for a hybrid plant design
- Describe methods of preferential chiller loading
- Explain the advantage of tertiary piping in specific applications
- Describe the impact of tall buildings on system design

### CHILLER PLANT OPTIMIZATION SELF-DIRECTED ONLINE CONTENT

- Explain load profile and why it is important
- Describe key design considerations
- Recommend design conditions for optimizing a chiller plant
- Describe various optimization tactics
- Explain chiller staging in chiller plant optimization

### ENERGY RECOVERY SELF-DIRECTED ONLINE CONTENT

- Explain energy recovery using a split condenser unit
- Explain why templifiers are used and the advantages and disadvantages of using templifiers in every recovery
- Explain how system design and control affect energy recovery

### WATER-SIDE-FREE COOLING SELF-DIRECTED ONLINE CONTENT

- Explain the advantages and disadvantages of different applications of water-side-free cooling
- Explain cooling tower sizing
- Describe the sequence of operation for water-side-free cooling

### THERMAL STORAGE IN CHW SYSTEMS SELF-DIRECTED ONLINE CONTENT

- Explain load profile (run time) related to thermal storage
- Explain the difference between full and partial load storage
- Describe the differences between thermal storage technologies

### PROCESS COOLING SELF-DIRECTED ONLINE CONTENT

- Explain the difference between process cooling and comfort cooling
- Explain the impact of chiller selection for process cooling
- Describe different types of process cooling
- Describe operating conditions for process cooling

### DISTRICT COOLING SELF-DIRECTED ONLINE CONTENT

- Describe chiller plant design considerations related to district cooling
- Explain chiller staging as it relates to district cooling
- Describe the advantages of series counter flow chillers
- Explain the advantages of changing a primary secondary piping layout to a distributed piping system
- Explain the benefits of district cooling



## CEU Calculation Formula

### CEU Calculation

- To qualify for CEUs, a learner must:
  - Inform Havtech that they want CEU credits prior to the start of the program
  - Complete all activities
  - Attend One (1) VILT session per module
  - Pass all tests with a minimum of 80%

Module	Estimated Hours to Complete	CEU Credits Eligibility
01 - Foundations	8	0.8
02 - Refrigeration	6	0.6
03 - Electric	10	1
04 - Airside	7	0.7
05 - Chillers	10	1
06 - Chiller Plant Design	8	0.8
<b>TOTAL</b>	<b>49</b>	<b>4.9</b>

### VILT DATES AND TIMES:

HVAC Systems Module 1 - Aug 18-29, 2025

VILT times:

Aug 19th - 2:30 pm – 4:00 pm  
 Aug 20th – 11:00 am – 12:30 pm  
 Aug 21st – 10:30 am – 12:00 pm  
 Aug 26th - 2:30 pm – 4:00 pm

HVAC Systems Module 2 – Sept 8-19, 2025

VILT times:

Sept 9th - 2:30 pm – 4:00 pm  
 Sept 10th – 11:00 am – 12:30 pm  
 Sept 11th – 10:30 am – 12:00 pm  
 Sept 16th - 2:30 pm – 4:00 pm

HVAC Systems Module 3 – Sept 29 – Oct 10, 2025

VILT times:

Sept 30th - 2:30 pm – 4:00 pm  
 Oct 1st – 11:00 am – 12:30 pm  
 Oct 2nd – 10:30 am – 12:00 pm  
 Oct 7th - 2:30 pm – 4:00 pm

HVAC Systems Module 4 – Oct 20- 31, 2025

VILT times:

Oct 21st - 2:30 pm – 4:00 pm  
 Oct 22nd – 11:00 am – 12:30 pm  
 Oct 23rd – 10:30 am – 12:00 pm  
 Oct 28th - 2:30 pm – 4:00 pm

HVAC Systems Module 5 – Nov 10-21, 2025

VILT times:

Nov 11th - 2:30 pm – 4:00 pm  
 Nov 12th – 11:00 am – 12:30 pm  
 Nov 13th – 10:30 am – 12:00 pm  
 Nov 18th - 2:30 pm – 4:00 pm

HVAC Systems Module 6 Dec 1-12, 2025

VILT times:

Dec 2nd - 2:30 pm – 4:00 pm  
 Dec 3rd – 11:00 am – 12:30 pm  
 Dec 4th – 10:30 am – 12:00 pm  
 Dec 9th - 2:30 pm – 4:00 pm