

PHCC Academy® HVACR 101 Syllabus

Course Contact for Registration and Non-LMS Questions

State Chapter Partner

Refer to <https://phccacademy.org/state-chapter-partner-contacts/>

Course Contact for Technical Problems in Absorb LMS

PHCC Academy® Staff - AcademySupport@naphcc.org

Prerequisites

None

Welcome to the PHCC Academy® Online Apprenticeship-Related Technical Instruction program for HVACR 101!

The PHCC Educational Foundation's HVACR program is designed to provide students with the opportunity to learn the textbook fundamentals of the HVACR trade in a self-paced online format. This training course must be supplemented by employers, through both technical assistance and on-the-job training in each area of instruction to meet the apprenticeship training requirements.

HVACR 101 covers fundamentals of the HVACR trade including: tools & safety; systems & components; basic electricity; mathematic principles related to HVACR; thermodynamics; the refrigeration cycle; maintenance & inspection of HVACR equipment and systems; systematic problem solving; and energy efficiency.

Course Goals

- Introduce students to the fundamental principles and practices necessary in the field
- Provide students with an understanding of HVACR equipment and systems
- Provide students with an understanding of math and science principles related to HVACR
- Familiarize students with installation, maintenance, troubleshooting, repair, and efficiency of HVACR systems

Required Textbook (Purchased Separately)

Refrigeration and Air Conditioner Technology (RACT), 9th Edition. Copyright 2021.

Assignments

The HVACR 101 course is comprised of 30 modules including a course introduction and 29 learning content modules with supplementary resources, as well as 29 module assessments and a comprehensive final exam.

In each module you will be required to do the following:

- Read Chapter
- Watch Lesson
- Take Exam

Module Titles:

- Module 1 - HVACR Industry Overview
- Module 2 - Basic Business Practices in HVACR
- Module 3 - Safety Practices & Basic First Aid
- Module 4 - Tools of the Trade
- Module 5 - Fasteners & Materials
- Module 6 - Tubing & Piping
- Module 7 - Calibrating Instruments
- Module 8 - Heating Systems & Components
- Module 9 - Cooling Systems & Components
- Module 10 - Airflow Distribution Systems
- Module 11 - Fundamentals of Electricity
- Module 12 - Electricity & Magnetism
- Module 13 - Electrical Safety
- Module 14 - Electrical Troubleshooting
- Module 15 - Introduction to Automatic Controls
- Module 16 - Mathematical Foundations for HVACR
- Module 17 - Measurements in HVACR
- Module 18 - Heat, Temperature, and Pressure
- Module 19 - Matter and Energy
- Module 20 - Basic Refrigeration Cycle
- Module 21 - Refrigeration System Components
- Module 22 - Refrigerants and Lubricants
- Module 23 - Maintenance and Inspection Program Overview
- Module 24 - Leaks and Leak Detection
- Module 25 - System Evacuation and Cleanup
- Module 26 - Installation and Repair Best Practices
- Module 27 - Systematic Problem Solving
- Module 28 - Troubleshooting Case Studies
- Module 29 - Measures of Efficiency in HVACR
- Comprehensive Final Exam

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Prerequisites

HVACR 101 or equivalent

Welcome to the PHCC Academy® Online Apprenticeship-Related Technical Instruction program for HVACR 201!

The PHCC Educational Foundation's HVACR program is designed to provide students with the opportunity to learn the textbook fundamentals of the HVACR trade in a self-paced online format. This training course must be supplemented by employers, through both technical assistance and on-the-job training in each area of instruction to meet the apprenticeship training requirements.

HVACR 201 covers refrigeration and refrigerants, control systems, motors, commercial refrigeration, heating and humidification, indoor air quality and human comfort, and cooling systems.

Course Goals

- Prepare students to work on HVACR systems, components, and equipment
- Prepare students to use and safely handle refrigerants and lubricants
- Introduce students to installation and troubleshooting practices
- Introduce students to principles and practices related to human comfort and psychometrics

Required Textbook (Purchased Separately)

Refrigeration and Air Conditioner Technology (RACT), 9th Edition. Copyright 2021.

Assignments

The HVACR 201 course is comprised of 30 modules including a course introduction and 29 learning content modules with supplementary resources, as well as 29 module assessments and a comprehensive final exam.

In each module you will be required to do the following:

- Read Chapter
- Watch Lesson
- Take Exam

Module Titles:

- Module 1 - Refrigeration Cycle Review
- Module 2 - Refrigerant & Oil Chemistry
- Module 3 - Refrigerant & Oil Management
- Module 4 - Charging a Refrigeration System
- Module 5 - Automatic Controls
- Module 6 - Troubleshooting Basic Controls
- Module 7 - Advanced Automatic Controls
- Module 8 - Types of Electric Motors
- Module 9 - Application of Motors
- Module 10 - Motor Controls
- Module 11 - Troubleshooting Electric Motors
- Module 12 - Evaporators
- Module 13 - Condensers
- Module 14 - Compressors
- Module 15 - Expansion Devices
- Module 16 - Special Refrigeration Components
- Module 17 - Applications of Refrigeration Systems
- Module 18 - Commercial Ice Machines
- Module 19 - Special Refrigeration Applications
- Module 20 - Troubleshooting for Commercial Refrigeration
- Module 21 - Electric Heat
- Module 22 - Gas Heat
- Module 23 - Oil Heat
- Module 24 - Hydronic Heat
- Module 25 - Indoor Air Quality
- Module 26 - Human Comfort & Psychrometrics
- Module 27 - Refrigeration Applied to A/C
- Module 28 - Air Distribution & Balance
- Module 29 - Equipment Installation
- Comprehensive Final Exam

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HVACR 301 Syllabus

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Prerequisites

HVACR 101, 201, or equivalent

Welcome to the PHCC Academy® Online Apprenticeship-Related Technical Instruction program for HVACR 301!

The PHCC Educational Foundation's HVACR program is designed to provide students with the opportunity to learn the textbook fundamentals of the HVACR trade in a self-paced online format. This training course must be supplemented by employers, through both technical assistance and on-the-job training in each area of instruction to meet the apprenticeship training requirements.

HVACR 301 covers servicing and troubleshooting systems, testing and balancing systems, energy efficient mechanical systems, fluid handling systems, electrical and refrigeration problem solving, troubleshooting with the psychrometric chart, cooling towers and evaporative condensers, commercial air conditioning, water treatment, indoor air quality, and blueprint reading.

Course Goals

- Prepare students to service, troubleshoot, and test and balance HVACR systems
- Prepare students to solve electrical and refrigeration problems
- Prepare students to work on energy efficient mechanical systems, fluid handling systems, and commercial air conditioning equipment
- Prepare students to manage comfort, water treatment, and indoor air quality

Required Textbook (Purchased Separately)

Refrigeration and Air Conditioner Technology (RACT), 9th Edition. Copyright 2021.

Assignments

The HVACR 301 course is comprised of 19 modules including a course introduction and 18 learning content modules with supplementary resources, as well as 18 module assessments and a comprehensive final exam.

In each module you will be required to do the following:

- Read Chapter
- Watch Lesson
- Take Exam

Module Titles:

- Module 1 - Servicing & Troubleshooting HVACR Systems
- Module 2 - Testing & Balancing HVACR Systems
- Module 3 - Energy Efficient Mechanical Systems
- Module 4 - Fluid Handling Systems
- Module 5 - Electrical Problem Solving
- Module 6 - Refrigeration System Problem Solving
- Module 7 - Troubleshooting with the Psychrometric Chart
- Module 8 - Evaporative Cooling Fundamentals
- Module 9 - Air Conditioning Basics
- Module 10 - High- and Low-Pressure Chillers
- Module 11 - Absorption Chillers
- Module 12 - Cooling Towers
- Module 13 - Water Pumps and Treatment
- Module 14 - Operation, Maintenance & Troubleshooting
- Module 15 - Packaged Rooftop Systems
- Module 16 - Variable Air Volume & Refrigerant Flow Systems
- Module 17 - Water Treatment in HVACR Applications
- Module 18 - Indoor Air Quality
- Comprehensive Final Exam

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HVACR 401 Syllabus

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Prerequisites

HVACR 101, 201, 301, or equivalent

Welcome to the PHCC Academy® Online Apprenticeship-Related Technical Instruction program for HVACR 401!

The PHCC Educational Foundation's HVACR program is designed to provide students with the opportunity to learn the textbook fundamentals of the HVACR trade in a self-paced online format. This training course must be supplemented by employers, through both technical assistance and on-the-job training in each area of instruction to meet the apprenticeship training requirements.

HVACR 401 covers topics centered around heat pump systems, including heat pump components; types and sizing; energy and efficiency; and installation, maintenance, and troubleshooting of both air source and geothermal heat pumps.

Course Goals

- Provide students with foundational knowledge about heat pump operation, components, and installation fundamentals
- Provide students with knowledge about energy and efficiency as related to equipment and structural factors
- Prepare students to install, service, and troubleshoot air-source and geothermal heat pumps

Required Textbook (Purchased Separately)

Refrigeration and Air Conditioner Technology (RACT), 9th Edition. Copyright 2021.

Assignments

The HVACR 401 course is comprised of 21 modules including a course introduction and 20 learning content modules with supplementary resources, as well as 20 module assessments and a comprehensive final exam.

In each module you will be required to do the following:

- Read Chapter
- Watch Lesson
- Take Exam

Module Titles:

- Module 1 - The Heat Pump Cycle
- Module 2 - Absorbing & Rejecting Heat
- Module 3 - Thermostats & Components
- Module 4 - Motors
- Module 5 - Compressors
- Module 6 - Specific Defrost
- Module 7 - Electrical Schematics
- Module 8 - Typical Heat Pump Systems
- Module 9 - Reviewing Energy & Efficiency Calculations
- Module 10 - Introduction to Residential Energy Auditing
- Module 11 - Auditing Gas-Fueled Systems
- Module 12 - Heat Gains & Losses
- Module 13 - Air Source Heat Pumps
- Module 14 - Installation of ASHPs
- Module 15 - Scheduled Maintenance of ASHPs
- Module 16 - Troubleshooting ASHPs
- Module 17 - Geothermal Heat Pumps
- Module 18 - Installation of GHPs
- Module 19 - Scheduled Maintenance for GHPs
- Module 20 - Troubleshooting GHPs
- Comprehensive Final Exam